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An Address.[1]

PROBLEMS RELATING TO THE SUPPLY OF MEDICAL EQUIPMENT.

By SIR ALAN NEWTON,

Colonel, Australian Army Medical Corps;
Chairman, Medical Equipment Control Committee.

THE objects of this address are to acquaint you with the present position of stocks of medical equipment in Australia, to inform you of the action taken by the Medical Equipment Control Committee to augment these supplies and to beg you to exercise the utmost economy in the use of drugs, dressings, instruments and all the other stocks included in the all-embracing term "medical equipment".

The possibility of a serious shortage of those items of this equipment which could not be manufactured in this country was foreseen by Major-General Downes, who, in collaboration with the Commonwealth Department of Health, obtained approval for the expenditure in January, 1939, of £73,000 for the purchase of certain drugs and instruments which were to be held in reserve. The drugs included the more important alkaloids, local anæsthetics, various antiseptics, arsenical preparations, sulphanilamides, sedatives, calomel, "Salyrgan", "Cardiazol" and "Coramine". The instruments were of types which could not be manufactured locally, such as thermometers, suture needles and syringes. The amounts of the various items which were ordered were computed on the basis of the quantity required for one year's supply for the civil population in time of peace. With the notable exception of hypodermic syringes, all the items in the list have been supplied in full and constitute a valuable "nest egg" today.

Another action taken prior to the outbreak of war was to constitute a medical equipment subcommittee of the Central Committee for the Coordination of Medical Services in Time of War. This subcommittee was given the task of investigating every problem relating to the supply of medical equipment and reporting thereon to the Central Committee, from which it derived its authority. Soon after the declaration of war it was apparent that the body which controlled the supply of medical equipment must possess executive powers. The Central Coordination Committee acts in an advisory capacity only and possesses no executive authority which it can delegate to any subcommittee. It was therefore decided to form a new committee, called the Medical Equipment Control Committee, and to give it executive authority by gazetting appropriate regulations under the powers conferred by the *National Security Act*. The Medical Equipment Control Committee is composed of a chairman, who must be a medical officer of the defence force, and one representative of each of the following government departments: the Commonwealth Department of Health, the Department of Supply and Development and the Department of Trade and Customs. There is also one representative of the British Medical Association. For the purpose of ensuring an adequate supply of medical equipment for the Navy, Army and Air Force and the civil population of Australia, the chairman of the Central Coordination Committee, acting upon the recommendation of the Medical Equipment Control Committee, may make orders to regulate, restrict or prohibit the production, storage, distribution, sale, purchase and use of medical equipment. The chairman of the Medical Equipment Control Committee, in order to obtain information concerning this equipment, has been given power to require any person carrying on a trade

[1] Delivered at a meeting of the Victorian Branch of the British Medical Association on September 4, 1940, and of the New South Wales Branch on October 25, 1940.

or business connected with the purchase, sale or distribution of medical equipment to answer any questions put to him, to furnish information, estimates or returns and to produce any books or documents. The chairman also has power to authorize an officer to enter premises to obtain this information. In view of the helpful manner in which all business interests concerned have cooperated with the committee, it is unlikely that an occasion will arise when the use of these powers will be necessary; but mention is made of the facts to indicate that the committee has been given statutory powers appropriate to its function of ensuring an adequate supply of medical equipment for all purposes in this country.

When the Medical Equipment Control Committee was first constituted, its chairman was Colonel Kingsley Norris, who was succeeded by Colonel the Honourable A. E. Colvin. Under their direction the committee did valuable work in making surveys of the supply of medical equipment, fostering local production of various drugs and instruments, and controlling and storing the reserve supply to which reference has already been made. My appointment as chairman coincided with a dramatic change in the course of the war, which made it necessary to envisage an increased demand upon supplies of medical equipment for military purposes. It was also necessary to augment these supplies in view of the possibility of interference with the inflow into this country of these materials by new developments, the risk of which must be apparent to everybody. It was obvious that it was out of the question to import adequate amounts of every single item of medical equipment; all that could be done was to try to ensure an adequate supply of essentials to build up reserves to the required level. It was therefore necessary to determine, in each division of medical equipment, what were essential items, what additional supplies of these items were necessary, and how these were to be procured. It is convenient to deal with these questions in relation to the various separate divisions of equipment.

Drugs.

In order to obtain an adequate supply of drugs, and in view of the impossibility of obtaining every drug preparation in the pharmacopœia, the committee asked Dr. Stanton, who is the representative of the British Medical Association on the committee, to compile a minimum or "bedrock" list of essential drugs sufficient for the treatment of all forms of disease. He was asked to give preference, whenever possible, to drugs manufactured in Australia from Australian raw materials. He consulted with others similarly skilled in the art of therapeutics and experienced in various branches of medical practice, and produced a list containing 130 drugs, of which 33 were made in this country from raw materials obtainable within its borders. There are 4,000 preparations in the "British Pharmaceutical Codex", so that this "minimum pharmacopœia" represents only 2·5% of the drug preparations at the disposal of the medical profession. It is therefore obvious that it contains the bare essentials, and only the bare essentials. It is unnecessary and probably undesirable to give the list in detail; but the principles adopted in its compilation are illustrated by the fact that digitalis appears as the dried leaf only, the isolated glucosides being omitted as unessential refinements. It would probably be hopeless to secure any measure of general agreement among all members of the medical profession concerning the constituent drugs in such a list.

In point of fact, one wholesale pharmacist to whom it was submitted in order to ascertain his present stock position of the drugs included in it, wrote to complain that some of the preparations most favoured by his clientele were not included and that, if he was confined to the drugs on the list he would have to go out of business. He was told that the purpose of the list was to ensure an adequate supply of essentials in the case of isolation of the country and that, in such an event, interference with his business would be only one of many misfortunes which Australia would be compelled to endure. To his credit be it said that he took the explanation very well and replied that he would cease to "throw bricks" at the "minimum pharmacopœia", but would offer an alternative suggestion in regard to the compilation of a list of this sort. He had often heard medical men say that they could carry on with six drugs, and therefore proposed that a list of these six drugs should be obtained from each of fifty medical men. From the list thus procured the fifty drugs with the greatest number of votes should be selected as the appropriate essentials.

There is perhaps more than a modicum of truth in this gibe. It is not proposed to publish the list, which after all is nothing but a selection of essential drugs which the Medical Equipment Control Committee has decided shall be imported into this country in adequate quantities with governmental assistance. It is competent for all the large drug firms to make such additional importations, within the limits necessarily imposed by quota and currency restrictions, as seem desirable from a business point of view. These firms are taking action along these lines, and there is no doubt that they would be pleased to receive representations from any member of the medical profession concerning his special requirements in order that they may take steps to obtain supplies for him. It is to be hoped that we shall never be restricted entirely to the drugs included in this list of essentials.

The Medical Equipment Control Committee, after it had obtained the list of "bedrock" essential drugs, had to determine what amounts of each drug would constitute an adequate supply. It was necessary to make provision for demands which could not be determined quantitatively with any degree of accuracy, but would depend upon the duration of the war, the degree of interference with normal trade with other countries additional to that already caused by the war, the incidence of epidemic disease and the magnitude of future military demands. The committee determined, quite arbitrarily, that if stocks were built up to the level of approximately three years' civil supply, adequate provision would have been made to meet these demands.

In order to make this provision it was necessary to place orders in other countries for appropriate quantities of the 97 drugs on the list which were not manufactured in this country, and to determine the channel through which these orders should pass. There were two alternatives. The Medical Equipment Control Committee, on the one hand, could obtain ministerial approval for the necessary expenditure and import the drug itself, a procedure open to the objection that the committee has limited storage facilities, a small staff and no established channels of communication with the retail trade. It was also reluctant to take any action which would cause undue interference with the normal course of business unless action of this sort was made imperative by the exigencies of the situation. The committee, on the other hand, could approach the wholesale drug firms with a request that these firms should make the required importations with governmental assistance, should this be necessary. It was decided to adopt the latter alternative and to convene a conference of representatives of these firms to discuss the position. The list of essential drugs was supplied to the firms represented at the conference, and these firms were asked to investigate the stock position of the drugs concerned and to pool their resources to bring this position up to the level of approximately three years' normal civil supply. The firms responded nobly and combined together for the first time in the history of the trade in order to accomplish the desired purpose. They investigated the stock position through the medium of a Federal and various State committees which they constituted for the purpose, and agreed upon the expenditure necessary to obtain the additional stocks. They also appointed one of their number to place orders overseas on behalf of all of them in order to avoid rises in price levels which might result from competition between them. They informed me that the expenditure would amount to £300,000, which seemed a very reasonable sum in these days, when "noughts mean nothing" in the cost of war-time supplies, and stated that they would like governmental assistance on the lines of the "security stocks agreement" which was being drawn up to provide for additional

reserves of essential commodities. The Medical Equipment Control Committee is part of the Department of Defence Coordination, and it was necessary to obtain the approval of this department and also of the Department of the Treasury and the Department of Supply and Development to the proposal that essential drugs should be declared "security stocks". Responsible officers of these departments were most helpful in obtaining this approval, and as soon as the terms of the agreement concerning these stocks had been decided upon by the many government departments which were involved, a further conference with representatives of the drug firms was convened to discuss it. It was at once apparent that the agreement had been drawn up chiefly to meet the problems involved in the importation of reserve supplies of single commodities, such as tin-plate and jute, and that it would be difficult, if not impossible, to apply it to the importation of 97 drugs in various quantities. The firms were not prepared to enter into this agreement, and it seemed that two months' work would be brought to naught and that other steps would be necessary to obtain adequate supplies of essential drugs. Fortunately this unhappy outcome of the negotiations was avoided by the action of the firms themselves, who decided to import at their own expense sufficient drugs to bring the stock position up to the level of two years' civil requirements. When the reserve supply under the control of the committee is taken into consideration the ultimate stock position will approximate to that of the three years' supply which was arbitrarily determined to be an adequate quantity. The firms pointed out that these additional importations were unwise from the purely business point of view, and that, in consequence, they felt justified in asking for some protection against loss due to falling prices at the end of the war by some assurances of restriction of imports and fixation of prices. They have undertaken to place orders forthwith, and I have promised to do everything possible to obtain these assurances.[1] The Medical Equipment Control Committee is most grateful to the firms for their patriotic cooperation.

This long story will serve to illustrate the difficulties connected with any proposal to augment supplies to a level greater than that which the firms would normally maintain under present conditions. It must be understood that all these negotiations have led up to the placing of orders only. The drugs are not yet in this country. The stock position will not be improved until the shipments arrive. Before I emphasize this point any further, it is convenient to describe certain other actions taken by the committee to augment drug supplies in special directions.

The stock position in the case of the drug known as "M & B 693" was not satisfactory in view of the possibility of an outbreak of an epidemic of cerebro-spinal meningitis amongst troops in camps. There had been great waste in the use of this drug, which, perhaps owing to the fact that its name formed a jingle rhyme that was easy to remember, was prescribed by many doctors to the exclusion of all other members of the sulphonamide group. The upshot of this practice has been a dramatic fall in the price of other members of this group. The committee caused regulations to be gazetted confining the use of the drug to a prescription basis, and has asked all members of the profession to prescribe it only for conditions in which its value exceeds that of other sulphonamides. The committee has placed an order for five million tablets, which is equivalent to one year's civil requirements, to be held by it as a reserve. It has been informed by the firm of May and Baker that arrangements are to be made for the manufacture of the drug in this country if necessary, and that, if interruption occurred to the normal source of supply, the firm had power to obtain Australian supplies from firms manufacturing it under licence in America. The committee today holds only 250,000 tablets as a reserve, and the stock position amounts to less than three months' normal supply. It is therefore obvious that economy in the use of "M & B 693" must be continued until a reserve has been established; this may take some time, owing to the great demand for the drug in the treatment of war casualties in England.

[1] Approval has been given to this request.

A few months ago the stock position in the case of calomel became acute, owing to the large demand for venereal prophylactic sets made by the defence forces. This drug affords a dramatic illustration of the effect of some military demands upon normal supplies. The civil requirements in the case of calomel amount to a few pounds annually, whereas army demands are expressed in tons. The reserve supply held by the committee was drawn upon to the extent of half a ton to meet this demand, and the reserve has since been restored to its original level. The firms have increased their orders of calomel to meet further requirements.

The promotion of local manufacture in bulk of drugs not hitherto produced in this country is naturally of the greatest importance, and the committee is doing everything in its power to foster this work. The large drug firms are extending their activities in this direction with satisfactory results, and it is hoped that important contributions to the list of drugs manufactured in Australia will soon result from this work. Valuable research work is being done by various scientists, notably by the Association of Scientific Workers in Sydney, who are working under the direction of and are financed by the University of Sydney. It is essential, from the point of view of the Medical Equipment Control Committee, that this work should be correlated with the possibility of mass production of the drugs concerned. In the case of sulphapyridine, attention has already been directed to the fact that May and Baker are making their own arrangements for local manufacture if this should prove necessary. Local manufacture of arsenical preparations has been investigated by a large manufacturing firm, and abandoned because of the prohibitive cost of the necessary plant and the fact that the necessary raw materials are obtained elsewhere from waste products of factories which do not exist in this country. These statements do not imply that the policy of the committee is to discourage research work of this kind, but, as its function is to ensure adequate supplies, it takes the view that it is preferable to spend money to obtain adequate reserve supplies when possible than to foster uneconomic local production. It does not wish to abandon the substance for a pursuit of the shadow. It is hoped that research into problems connected with the manufacture of some drugs, notably flavine, will lead to commercial production in this country, and the committee wishes to encourage any research which may achieve this result.

A similar state of affairs exists in regard to medicinal plants which can be grown in Australia. It is necessary "to keep both feet on the ground" when problems connected with the mass production of drugs obtained from these plants are under consideration. It has recently been shown that *Duboisia myoporoides*, which grows freely in certain parts of Australia, contains 2·5% of hyoscine. When this fact was mentioned to a large manufacturer, he pointed out that his requirements of hyoscine for three years would not amount to more than two ounces, and that he held much greater supplies. He also stated that in other countries the collection of medicinal herbs was a peasant industry and that it would be quite impossible to compete in the world market if he had to pay wages at Australian rates for this work. He was not interested, therefore, in the percentage content of hyoscine in *Duboisia*. Some of his colleagues confirmed his opinion. It is probable that, in addition to hyoscine, hyoscyamine, atropine, opium, ergot and digitalis can be produced from plants grown in this country, and the committee is anxious that the drug content of the plants concerned should be standardized. Arrangements for this work have been made; but it may be difficult to provide for mass production after this has been done. It seems probable that some form of governmental assistance for this work will be necessary if a decline in the stock position should justify it.

The Medical Equipment Control Committee has been active also in other directions. One of the most important of these consists in the giving of advice about quota restrictions on the importation of various drugs when the Department of Trade and Customs requires it to do so.

There is no purpose to be served by the enumeration of these activities in detail, because sufficient emphasis has been laid on the fact that the committee is doing everything in its power to augment supplies. The large orders which have been placed must remain nothing more than pious hopes for the future until the drugs concerned are actually in this country; the vital question must be: "What is the actual stock position of drugs in Australia today?" Thanks to the action taken by various firms in increasing their stocks in anticipation of war-time demands, and thanks also to the reserve controlled by the committee, more than one year's normal supply of essential drugs is held in store; but it is necessary to remember that these drugs constitute only 2·5% of the total number of drug preparations. There are already shortages in supplies of certain drugs not on this list, and these are sure to increase in number, owing to the fact that there has been great interference with production as a result of the war. As the supply of various drugs diminishes, there must be an increased demand for alternative therapeutic preparations included in the essential list. The position, therefore, is far from safe, and it is imperative that all members of the medical profession should exercise strict economy in the use of drugs. This economy is not to be postponed until some date to be fixed in the future; it must begin today if serious deficiencies are to be avoided.

It has been a common practice, when tablets such as sedatives and sulphonamides are being prescribed, to order more than are actually required. This practice, to use an army phrase, must cease forthwith. It is desirable to avoid prescriptions containing a number of drugs, but to use a simple preparation of one drug which will produce the desired therapeutic action. Whenever possible, preference should be given to drugs made in Australia from Australian raw materials, and a list of appropriate prescriptions containing these drugs has been prepared for general information. It is unnecessary to multiply examples whereby greater economy can be achieved, because every doctor can devise methods of saving drugs once the necessity for action of this sort is brought to his notice.

Apart from the exercise of due economy, every member of the medical profession can help the national effort in other directions. It would be, for example, unfortunate if the morale of the public was impaired by the suggestion that the failure of supplies of some special preparation was responsible for an increase in mortality. To take an example already used, it would be unfair and unjust to attribute a death from heart failure to the fact that the isolated glucosides of digitalis were unobtainable and that it was necessary to use only tablets of the dried leaf or the tincture. It is probably unnecessary and offensive to have made this observation, because it is difficult to believe that any member of our profession would convey such a suggestion intentionally to a member of the public. Let us take care to avoid doing so unintentionally.

Finally, every doctor can help by doing everything in his power to avoid waste of foreign credits. It is urgently necessary to use these credits for some essential items of equipment, and it is therefore our duty to diminish our demands for non-essentials. This can be achieved by refraining from the practice of prescribing certain expensive imported proprietary preparations, notably various cough syrups (which rely mainly upon a small dose of heroin for a therapeutic effect), tonic syrups and, as far as possible, vitamins. You may be told that many of these preparations are made in Australia. If this statement is made, please ask where the raw materials for their manufacture are obtained. It would be easy to quote other examples, but enough has been said to enable you to judge for yourselves how you can best help your country in this way. You will not go far wrong if you return to the use of the pharmacopœia published by the hospital in which you were trained. The reply given during the last war by Sir Neville Howse to a junior medical officer, who complained that his therapeutic efforts were seriously impeded by the lack of certain proprietary preparations, may encourage you to do so. He said: "My boy, you do not require them. You are here to treat the sick, not to deceive the public."

Surgical Dressings.

The principal items included under the heading of surgical dressings are gauze, adhesive plaster, cotton wool and bandages.

All supplies of surgical dressing gauze are imported, and there seems little, if any, prospect of arranging for local manufacture during the war. It is difficult to obtain an accurate estimate of the amount of gauze required annually for surgical dressings, because in the first place importations are by no means limited to firms concerned with the supply of these dressings, and in the second place the position is confused by the fact that it has been impossible to separate importations of gauze to be used in the manufacture of menstrual pads from that intended for surgical purposes. It seems probable that the normal annual consumption was in the vicinity of five million yards, but that, with the exercise of strict economy, four million yards would suffice for our needs. The Medical Equipment Control Committee desires to obtain as soon as possible an amount of gauze equivalent to three years' normal supply, and convened a meeting of representatives of the various trading firms in order to ascertain the degree of assistance which could be expected from them. It was soon apparent that, for various reasons, it would be impossible to obtain a measure of united cooperation from this trade comparable with that which had been accorded by the wholesale drug firms. The committee therefore decided to place an order itself for three million yards of gauze to be held as a reserve, of which one million yards were earmarked for military use, and to ask each firm to import as much as it could as soon as it could, in order to increase the total supply. Two firms have already placed orders approximating to five million yards of surgical dressing gauze, and it is expected that others will add to this total by further orders. When the total amount on order has been ascertained, the committee will determine whether it is desirable to take further steps to increase supplies.

The supply of gauze in the country today is not more than one million yards, an amount which is very far below the desirable stock position. It is therefore necessary that great economy in the use of gauze should be exercised until the orders already mentioned have been met. Gauze is frequently wasted by unnecessary changes of dressings on aseptic wounds, and large quantities which could satisfactorily be reclaimed for future use are thrown into rubbish bins. It is hoped that all surgeons will take action to prevent undue demands upon the meagre supply available in this country by preventing these and other examples of extravagance in the use of surgical dressing gauze.

Hitherto the preference of surgeons in this country has been for the more expensive closely woven types of surgical dressing gauze. The British Government has now standardized all gauze produced in that country so that it conforms to the "British Pharmaceutical Codex" grade, which is more loosely woven, the average number of threads per inch being not less than 19 in the warp and not less than 15 in the weft, as compared with counts in the twenties to which we are accustomed. Surgeons must therefore abandon their "Rolls Royce" tastes in gauze and use the standard quality without complaint, because it is the only quality they will get. It is quite adequate for all purposes, its sole disadvantage being that it will not stand reclaiming to the same extent as better quality gauze. In view of the fact that only a small percentage of the total quantity of gauze used in hospitals is reclaimed at present, this does not appear to be a valid objection to its use. The reserve supply of gauze ordered by the Medical Equipment Control Committee is of standard "British Pharmaceutical Codex" type.

It is impossible to establish a reserve supply of adhesive plaster, because this material cannot be preserved in good condition for a longer period than six months. It is probable that it will be manufactured in this country by at least one firm, which is at present installing

a plant for this purpose, and hopes to have arrived at the stage of commercial production by January, 1941. In the meantime it is necessary to emphasize the suggestion in a recent "economy circular" issued to all members of the medical profession by the committee, that substitutes for adhesive plaster should be used as much as possible.

Cotton wool is manufactured in Australia, but it is not possible, owing to other vital demands upon the supply, to use more than a small proportion of the local crops of cotton for this purpose. The bulk of the raw material is obtained from India. The supply of cotton from India which is in Australia today will suffice for approximately nine months for the manufacturers of cotton wool. Here again, therefore, it is necessary to exercise economy until plans to establish a greater reserve of Indian raw cotton have been brought to successful fruition. In addition to the making of plans of this sort, the committee is investigating the usefulness of various substitutes for cotton wool in surgical dressings.

The position in regard to bandages is less acute, because various substitutes, including flannel manufactured locally, can be used in place of surgical bandage gauze. Various firms have imported stocks of this orthodox bandage material, and in order to make these stocks last as long as possible it is desirable to avoid cutting bandages and to reclaim used bandages for further service.

Surgical Instruments.

With the exception of optical and illuminated instruments, gum-elastic instruments, suture needles, scissors, detachable blades of the Bard-Parker type and syringes, surgical instruments can be manufactured in Australia. English instrument manufacturers are working under great pressure to meet war demands, so that we cannot look to them for supplies, nor is it desirable that we should expend foreign credits for this purpose. We must therefore rely upon our own manufacturers, and here the difficulty lies in the fact that we have forsaken these men in the years of peace by showing a marked preference for imported instruments. One Australian firm, which endeavoured to compete on a large scale against the importers of surgical instruments, was forced to relinquish the struggle after losing £20,000. This fact is well known to all those at present engaged in this trade; but, despite it, we are now compelled to ask them to expand their activities to the utmost. To their credit be it said that they are striving to do so, though they are naturally handicapped by a shortage of skilled labour. They have been given a good stimulus by the issue of a large order for military requirements, which provides to some extent for future as well as immediate needs. They have also been helped by the fact that military instruments have been simplified and standardized as much as possible in order to facilitate "mass-production". An example of this standardization is that the "artery forceps" means a six-inch straight forceps of the Spencer Wells type. All surgeons must use this forceps instead of the widely different varieties which have been at their disposal in the past. Those who find themselves unable to do so should consider the wisdom of abandoning the practice of surgery and entering that more senior branch of the profession which confines itself to medical work. This is not the time to complain about instruments. Any surgeon worthy of the name can do good work with very few and very simple tools. It is to be hoped that our successors will profit from the knowledge that, if we had supported local manufacturers to a greater degree, we should not be in our present predicament in regard to the supply of instruments. There seems some reason to believe that we shall be extricated from it by the efforts which are being made by this trade to increase its production to a degree adequate to meet both military and civil needs.

The stocks of needles, scissors and detachable scalpel blades amount to only a few months' supply, although orders have been placed for greater quantities. Care and economy in the use of these instruments will help to eke out present stocks. The chief enemy of the suture needle is rust. This can be avoided if all needles are cleaned and oiled immediately after use. Detachable scalpel blades should be greased and kept after use so that they can be resharpened if supplies should fail.

The stock position of hypodermic syringes is very bad. "Record" type syringes are unobtainable, and the supply of all glass syringes amounts to one week's normal civil consumption. There has been great difficulty in obtaining supplies from Britain, and the Department of Trade and Customs, on the recommendation of the Medical Equipment Control Committee, has taken steps to facilitate importations from the United States of America. It is urgently necessary to use American credits for these essential instruments, a fact which lends force to the plea already mentioned that care should be taken to avoid undue demands upon these credits in other less important directions. The order placed in Britain eighteen months ago for syringes for the reserve supplies under the control of the committee has been met only to the extent of one-third of the total quantity demanded. It is to be hoped that nobody will be so unpatriotic as to use this information as an excuse for buying and hoarding for future use such syringes as are obtainable today.

Radiological, Pathological and Dental Equipment.

The committee is investigating the essential requirements in radiological, pathological and dental equipment, and is taking steps to augment stocks which are similar in principle to those which have just been described in relation to drugs, dressings and instruments.

Summary.

This completes a brief review of the present position in regard to medical equipment. You will realize that there are many more entries on the debit than on the credit side of the ledger. The Medical Equipment Control Committee is doing everything in its power to improve this position; but when you reflect on this statement of its activities you must differentiate between promise and performance. Promise consists in the placing of orders; performance is the arrival of the goods in this country. The committee realizes that as yet promise far outweighs performance. Let us hope that this state of affairs will soon be reversed. In the meantime it will help to redress the balance if all users of medical equipment will take to heart the following terse advice: "Don't hoard unfairly. Don't growl unduly. Economize and improvise."

INJURIES OF THE FLEXOR TENDONS OF THE HAND.[1]

By L. O. BETTS,
Adelaide.

THE importance of the flexor tendons of the hand has not been sufficiently emphasized in surgery. The following is a recent statement by Watson Jones:

> The joints of the fingers and thumb are the most important in the upper limb, and yet injuries of these joints are often most neglected.

The flexor tendons provide the motor mechanism that produces function at these joints; without the tendons they are practically useless.

The function of the upper limb all centres around the power of the grip in the hand, which is dependent on the flexor mechanism of the fingers and thumb. Without the latter an upper limb is useless. By this delicate mechanism all classes of manual work are performed.

The first problem to be decided in any flexor tendon injury is whether to perform primary repair or not. If wounds have been made by a sharp instrument, the skin being little damaged and cleanly cut and the hand reasonably clean, then a primary suture is advisable if the patient is seen within twelve hours of the accident and if the operation can be performed under the best conditions.

[1] Read at the annual meeting of the Australian Orthopædic Association, March, 1940.

If the wound is of a crushing nature, with much damage to skin and other tissues, if the skin is very dirty, or if there is any doubt in the surgeon's mind, the hand should be surgically cleansed and the skin lightly sutured, the hand being put at absolute rest with the affected finger or fingers and wrist flexed rather more than in the usual position of maximum function. This position is adopted to prevent great retraction of tendons. Should healing take place without infection, then secondary suture is undertaken within two or three weeks. When infection occurs, it should be treated by free drainage and rest. Drainage incisions should be in such positions as not to interfere with future function of the flexor tendon, of which more will be said later. There seems to be fairly general agreement in the literature on this view of primary and secondary suture.

The surgical treatment is thus divided into the following categories: (i) immediate primary suture (performed within twelve hours); (ii) secondary repair, (*a*) early suture (up to six weeks, preferably two or three) and (*b*) late repair (more than six weeks). For practical purposes the cases can be anatomically divided into the following groups: (i) injuries within the fibro-osseous tunnel formed by the vaginal ligament—that is, distal to the palmar crease; (ii) injuries proximal to the palmar crease.

Primary Suture in the Vaginal Tunnel.

A close study of the anatomy of the flexor tendons within the vaginal tunnel will explain the difficulties of repair in this situation. Here we have two tendons working within a very close-fitting, flexible, jointed fibro-osseous tunnel. One tendon bifurcates and completely surrounds the other within this tunnel, yet works independently. The delicacy of this wonderful mechanism is such that any repair effected by surgery must be of a comparatively clumsy nature, and will certainly bring about mechanical conditions that fall far behind the beautifully fitting tendons in their normally firm yet flexible tunnel. The condition of *teno-vaginitis stenosans*, producing trigger finger, illustrates the effect of tendons trying to work in a tunnel too narrow for them. In this condition the proximal edge of the vaginal sheath has become fibrosed and contracted; if this constriction is released by splitting of the sheath, there is room for the tendons and the condition is cured.

In a search of the literature it is difficult to find any description of the actual procedure followed in primary suture within the tunnel. The problem is usually discussed without details of methods being given.

Primary Suture within the Tunnel over the First Phalanx.

In a bloodless field (I use a carefully applied Esmarch rubber bandage) the tendon should be approached through incisions lateral or transverse to it; above all, "the pernicious median longitudinal incision" (Bunnell) should be avoided. It is regrettable that in Rose and Carless's text-book this incision is still advocated; but I am afraid it is still the customary one. The proximal end of the severed tendons should be reached through a transverse incision in the palm. If both tendons are severed the sublimis is pulled out and cut back well into the palm. A Bunnell stitch of silk suture (number 3) is inserted into the profundus, which is then pulled back distally through the tunnel into the wound by means of a probe. The distal end of the sublimis is then also cut back distally, a similar stitch is inserted into the distal end of the profundus and the tendon is brought together in close coaptation. Should any repair of the vaginal sheath be possible, fine catgut sutures are used, but never over the palmar gliding surface.

When only the sublimis has been divided no tendon suture should be attempted. There is not room in the tunnel for more than one repaired tendon.

Repair of the profundus distal to its passage through the bifurcation of the sublimis is performed in the same manner, but its proximal end can usually be picked up through the wound with a forceps when the wrist and finger are fully flexed. If this cannot be done, it is probably better to fix the distal end to the second phalanx; the terminal joint is thus fixed in slight flexion. With a fully acting sublimis and slight fixed flexion of the terminal joint excellent function is obtained.

Afterwards the hand should be splinted with the wrist in flexion and early movement should be allowed within the range of comfort. The suture will carry all strain likely from such movement.

Primary Suture in the Palm of the Hand and at the Wrist.

In the palm both tendons may be sutured with a good chance of return of function. Injuries at the wrist usually involve the median or ulnar nerve. The nerve should be sutured even when there is a possibility of sepsis, as late nerve suture is not so satisfactory, and the suture will frequently be effective even if some sepsis ensues. In this situation great care should be taken to identify each individual tendon and to see that it is correctly united to its distal component. This is a long and tedious operation, requiring meticulous care and good anatomical knowledge.

Secondary Suture.

When the wound has healed by first intention, and if there is no sign of deep infection, suture of the tendons should be undertaken within three weeks. The same operation is performed as previously described.

Whether the infection is mild or severe, tendon grafting is required. If the infection has been severe, grafting cannot be attempted for several months.

Free Tendon Grafts in the Reconstructive Surgery of the Hand.

Sterling Bunnell first described his methods of free tendon grafting in 1918. Since that time he has published many further articles; but his work does not seem to have received the recognition it deserves. A description of similar work by Lexer is given in Binnie's "Operative Surgery", published in 1913. The points in that article are worth quoting:

> Make short incisions in the natural transverse folds in the finger, palm or wrist. The wound must not be directly over the graft . . . Suture the graft to the vivified bone . . . Begin movements on the sixth day . . . If there has been any inflammation with scarring, thorough excision of scar tissue and plastic repair by skin grafts is absolutely requisite before tendon grafting may be attempted . . . Free fat transplants were used to surround the tendons . . . Fingers gained one half their function.

The following quotation outlines the principles on which Bunnell bases this work:

> If the flexor tendons are severed in the fingers in the usual place opposite the proximal phalanx, one cannot join them by suture with success, as the junction will become adherent in the narrow fixed channel and will not slip. It is better to remove the tendons entirely from the finger and graft in a new tendon, smooth throughout its length. The suturing is then done in the palm and at the distal phalanx, where adhesions will be of less importance. One flexor tendon in a finger must suffice.

Tendons hopelessly damaged or destroyed by sepsis or trauma can be successfully replaced by free tendon grafts, provided that there is no serious damage to the joints. Although on economic grounds it may be necessary to sacrifice digits so damaged, surgically there is no excuse for such mutilation.

The details of the operation are as follows. Scrupulous care in asepsis should be taken, the skin undergoing a very thorough preparation. The hand and forearm are first rendered bloodless by a rubber bandage. The incisions are made in the palm of the hand so that none crosses the palmar creases at right angles and none lies over the line of the graft. Incisions along the fingers are placed laterally between the dorsal and volar nerves. All scar tissue is carefully and cleanly dissected away until the bed for the graft consists of normal healthy tissue. The sublimis and profundus tendons distal to the palm are removed. The proximal end of the profundus tendon is obtained and freshened by a clean cut after a Bunnell stitch of braided silk has been inserted ready to attach to the graft. The tourniquet may then be released and hæmostasis completed by pressure and very fine catgut ligatures if necessary.

An incision is then made over the tendon from which the graft is to be obtained. Cut the distal end of this and insert the Bunnell stitch before freeing the other end. A great deal of time is saved and trauma to the graft is avoided by this measure, as it is exceedingly difficult to insert stitches in the graft once it is freed at both ends.

Carefully measure the length of the graft required and then insert the stitch in the proximal end before cutting it free. The graft can then be tied to the proximal end of the profundus tendon in the palm, laid in its bed and passed through the flexor tunnel of the finger (if this is healthy). The distal end is stitched to the distal phalanx through a drill hole in the base of the latter. The stitch is tied over the insertion of the extensor tendon through a small dorsal transverse skin incision.

For flexor tendons the wrist is fixed in slight flexion by a dorsal splint. This allows active movement of the fingers without any possibility of excessive action. Active movements are commenced next day. These require careful supervision, it being necessary to give exercises with fixation of the proximal phalanx and then of the middle phalanx to ensure that the tendon action extends to the distal and not to the middle phalanx only. Mobility diminishes until the end of the second week, after which it gradually increases.

FIGURE 1.

A: A Chart of advisable incisions which will afford access and not cause disability. *B*: Mid-lateral incisions of the finger to avoid volar nerves and vessels which do not produce flexion contractions. If these are made intermittently opposite the joints, the annular ligaments which are opposite the centre of the phalanges will be spared. *C*: Incisions for approach to extensor tendons of fingers. (After Bunnell.)

The graft is usually obtained from the *palmaris longus*, from the *flexor sublimis*, or from one of the tendons of the *extensor longus digitorum* of the foot. The tendon with all the surrounding loose fat (paratenon) is taken so that the tendon and sliding mechanism are grafted *en masse*. The paratenon should be cut longer than the tendon. Where paratenon is unavailable or scanty, similar fat is obtained over the triceps tendon or the *fascia lata* and wrapped round the graft. This fatty tissue is very elastic and allows a free gliding movement; it is different in structure from ordinary subcutaneous fat, which contains much more fibrous tissue.

When the normal pulleys have been damaged by sepsis or trauma, their scarred remnants are fully dissected away and a new pulley is formed by a piece of tendon encircling the first and second phalanx, the ends being stitched together laterally. If the flexor tunnel must be split, it should be cut laterally, so that when it is stitched back the suture line will be away from the part on which the sliding tendon bears weight. When the flexor tunnel has not been damaged by sepsis, or only very slightly by trauma, the graft can be safely passed through it, provided the graft is not too tight a fit. For this reason the *palmaris longus* or extensor of the toes is preferable to the sublimis.

The features of the Bunnell stitch are that when it is inserted and tied there is practically no suture material showing on the sliding surface of the tendon. It is so applied that it is strong enough to carry any load put upon it by the daily exercises without giving at all. The amount of tendon tissue included in the stitch is very small, so that a minimum of tissue is strangled in the stitch.

The importance of the correct methods of incising a hand for sepsis is particularly patent when the reconstructive repair of tendons is undertaken. What Bunnell calls "the pernicious median longitudinal incision" is to be heartily condemned. This incision makes it impossible to get a first-class result from grafting later, as the resulting scar causes adhesions along the whole length of the graft. Furthermore, this scar almost always contracts and becomes keloid, especially at the palmar creases.

In my own small experience of this work the best results have been obtained when there has been no damage to the normal pulleys. In one case, in which two inches of the *extensor brevis pollicis* were excised owing to the presence of a tumour, a graft was inserted through the ligamentous tunnel and normal function was restored in four weeks. An equally good result was obtained in long-standing cases of rupture of the *extensor longus pollicis*.

In all cases in which grafts have been used to replace flexor tendons to the fingers, improvement in function of a useful nature was obtained. In the best cases 60% and in the worst case only 20% of normal range of flexion was obtained.

In the latter case accidental infection ruined the result, although contrary to all expectations the graft lived in spite of a severe staphylococcal infection. I have seen this patient recently, eight years after operation, and the function of the infected finger is better than that of the adjacent one, that was also grafted but not infected.

Conclusion.

Only a bare outline of this work has been given. For those interested I would advise a close study of the articles given in the bibliography. The work is fraught with many technical difficulties and is bound to give unsatisfactory results unless the surgeon is prepared to carry out the operation and its after treatment with meticulous care as to details.

The final result is not seen until twelve months after operation, when the hand has been in active service for many months. It is difficult to get active movement at the distal joint, and for this reason I would keenly advocate that the tendon graft be left a little short. This gives the additional advantage of having the finger commencing its movement from the position of optimum function. A finger beginning from this position and flexing only through 20° to 30° at the interphalangeal joints will give a very useful function if the metacarpo-phalangeal joint has a good range, as it usually has.

In cases in which infection has ankylosed the two distal joints, provided that the finger has been splinted a little more flexed than the position of optimum function, a useful finger will result if there is a full range at the metacarpo-phalangeal joint.

At a discussion at a meeting of the British Orthopædic Association in 1931, Elmslie said he had never seen a really satisfactory result of tendon repair with the tendon cut below the distal palmar crease. Almost all other speakers agreed. All spoke of the danger of allowing casualty officers to suture cut tendons. Operation was never to be regarded

as an emergency. The patients should be admitted to hospital and treated as if undergoing a major operation. They should be operated upon only by senior surgeons or preferably by those accustomed to tendon surgery. Until this is the usual practice surgical treatment of the flexor tendons is likely to be unsatisfactory. Under the best of conditions it will never be satisfactory if surgeons are expecting a perfect result, for, as I have tried to show, it is impossible to reconstruct the beautiful flexor mechanism of the finger once it has been damaged.

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DELAYED UNION IN FRACTURES.[1]

By F. H. McCLEMENTS CALLOW.
Sydney.

IT is essential when delayed union in fractures is being discussed to consider briefly the pathological changes which take place during the process of union in a simple fracture. When a bone is broken, hæmorrhage takes place from the vessels of the periosteum, the Haversian canals and the bone marrow. The amount of bleeding depends, of course, on the vascularity of the part and the stripping up of the periosteum. Fibrin is then deposited beneath the periosteum, about the fragments and in the medulla; and this fibrin acts as the natural stimulus to fibroblastic proliferation.

Within a few hours the cells begin to proliferate, and they gradually invade and absorb the fibrin mesh. This process is followed soon afterwards by a proliferation of vascular endothelium; end-buds from the local vessels commence to appear from about the third day onwards, and they invade the clot and replace it by vascular œdematous granulation tissue. This granulation tissue, which is referred to as procallus granulation, is well established in one week. The masses of granulation from the opposing fragments fuse and reestablish a vascular connexion within two weeks. This time is a factor of the utmost importance in the treatment of a fracture to prevent delay in union.

Once vascular communication has been established, it is merely a matter of time for the osteoblasts to increase in number along these minute vessels, and cartilage and osteoid materials are gradually deposited so that ossification follows the lines of these minute blood vessels.

This is followed by a gradual process of deposition and absorption of new and old bone respectively until the bone structure is reformed in a rather irregular mass, and when the stimulus of function is applied the excess bone outside the lines of force is gradually absorbed and the marrow again becomes lymphoid.

The periosteum must be regarded as a most important factor in the union of fractures, as it is the main source of blood supply, it acts as a bridge between the fragments when not torn itself, and it acts as a limiting membrane for the outgrowth of new bone and ingrowth of dense avascular scar tissue from the outside; this is likely to grow in and strangulate the tender vessels.

It is seen from this that union actually depends on the establishment of vascular connexions between the two masses of procallus granulation which take place during the second week. This is a most important practical point, as any manipulation during or after this period means that these vessels are torn and become fibrosed; there is then considerable delay before further vessels are reformed, with consequent delay in union.

It is essential, therefore, in order to be certain of speedy union, that all manipulations should be carried out at the earliest possible moment, so that the vascular connexions are not broken down.

[1] Read at the annual meeting of the Australian Orthopædic Association, March, 1940.

It must be borne in mind also that union often takes place quickly after mobility has been detectable for quite a considerable time. A most important point that is responsible for very many cases of both delayed union and deformity, is the fact that while new bone is being formed there is a considerable amount of absorption taking place about the fracture site; in other words, there is a considerable amount of decalcification about the fracture site. Often allowance is not made for this fact, and splints are discarded when decalcification has rendered the bones soft.

It has been shown that there is a period of weakness after union has apparently become firmly established; that is to say, union may be clinically quite firm, say six weeks after a fracture, and at eight weeks there is a diminution of strength, so that much less force is required to refracture the bone than was necessary two weeks before. Elaborate experiments have been done on fractures in animals to determine the exact force necessary to refracture a bone, and this fact was definitely proved by these experiments. It is, of course, not unusual in Pott's fracture for a late deformity to occur after union is apparently quite firm. It is a fascinating study to view the opinions of various workers on the formation of bone and the healing of fractures.

As far back as 1739 Duhamel carried out certain simple yet ingenious experiments, which he regarded as proving that periosteum was the chief agent in bone production. He found that animals, mainly swine, eating a certain vine during the growth period, had their bones stained a deep red. By feeding swine alternately on an ordinary diet and one containing this vine he found that he could get alternative concentric layers of red and white bone, so he assumed that the new bone was laid down by the periosteum. He also found, by the simple process of making two marks on a growing bone and exposing them later, that the distance between these marks did not increase with growth, so he assumed that growth took place from the ends—that is to say, from the epiphyses.

Later on, Haller, from certain experiments, regarded the periosteum merely as a nourishing membrane, and believed that it had no bone-forming properties. John Hunter accepted this latter opinion, because he found that a fragment of bone detached from its periosteum was able to grow and unite again to the main bone. He pointed out also the very important fact that in bone growth there were two distinct bone processes which were closely related, namely, deposition and absorption. He stated that bone was constantly changing its matter.

In 1768 the first clinical experiment on bone growth was made when Charles White dissected the upper end of an infected humerus and was surprised to find four months later that it had regenerated, apparently from the periosteum. Syme removed a segment of two bones, leaving the periosteum of one intact; he found in this that the shaft of the bone was reformed. Goodsir carried out a microscopic study and saw that new bone was formed from the corpuscles and not from the periosteum itself. His conclusion was that new bone, which was apparently formed from periosteum, was in fact formed from particles of bone adherent to the periosteum. Ollier carried out very extensive experiments. He found that flaps of periosteum raised from the bone, but with the base still attached, formed new bone. He then completely removed the flaps of periosteum and transplanted them, and found that new bone was still formed. He found that the long bones formed callus better than flat bones, that the *dura mater* was better than the pericranium, and that young animals were better than old. In all these cases new bone was formed on the deeper aspect of the periosteum only. Ollier also found that ligation of a nutrient artery made no difference to the union of a fracture. He found that osteogenic power was increased by mild irritation. He also concluded that bone detached from its periosteum and marrow was merely a foreign body. (It must be borne in mind, however, that asepsis was not practised at this time.)

In 1880 the first clinically successful bone graft was carried out by McEwan, who had two years previously resected the upper end of a humerus which had failed

to regenerate. The sources of bone were small wedges removed from several other patients who were at that time undergoing osteotomy for deformity. It is interesting that McEwan did not accept Ollier's opinion and regard the periosteum as merely a limiting membrane.

Dobrowolskaja has carried out a number of experiments *in vitro*. He found that in homogeneous plasma compact bone without periosteum or marrow grew well, and in fact two pieces lying side by side became joined firmly together. The periosteum he found to produce practically no new bone. The spongiosa gave a most intensive growth of bone. He found that the periosteum gave compact bone a more prolific growth and that blood coagulum was a great help to growth.

It is obvious that for normal development of callus and consequent union between the fragments an adequate blood supply must be maintained, and it is in this connexion that we find one of the commonest misconceptions in orthopædic surgery, namely, that the nutrient artery is the main source of the blood supply of a bone. Actually there are three sources of blood supply, and in order of importance they are: (i) the minute periosteal arteries, which are more numerous in situations where there are fleshy muscular attachments, and much less numerous in portions of the bone unclothed by muscle, such as the lower end of the tibia and ulna, the neck of the femur and the carpal bones, particularly the navicular; (ii) moderate-sized vessels entering the bone near their extremities; (iii) the nutrient artery.

Lacey, experimenting with injection of the vessels with "Campiodol", an opaque fluid, found that the blood supply of the bones could be very well demonstrated radiographically in living animals. He found that if the nutrient artery of the tibia was ligated, the injection of the vessels of the tibia was almost as complete as in cases in which the artery was not tied. He found that injection of the nutrient artery alone caused a very poor display in the vessels in the lower end of the tibia. He also found that in experimental fractures the normal blood supply of the part was much increased. He found that ligation of the anterior tibial artery caused little or no delay in union, but an injection of the vessels with "Campiodol" showed that the blood supply of the tibia was still satisfactory owing to anastomosis through the *dorsalis pedis* artery. However, ligation of both the anterior tibial and the *dorsalis pedis* arteries caused a great delay in union of the fracture, or even non-union. From these experiments Lacey concluded that non-union in a fracture could be produced in laboratory animals by interference with the blood supply.

In late years interesting work has been done on the blood changes in fractures, particularly in the presence of non-union. The biochemical changes are extremely complicated and as yet apparently very little understood. It has been pointed out that the mineral ash from areas of calcification and ossification are the same. Another fact is that calcium carbonate and phosphate are seven times more soluble in albuminous solutions than in water and are consequently more easily carried in the blood stream. Apparently calcium is carried in the form of a tribasic calcium carbonophosphate which is deposited at the fracture site because of the altered alkalinity of this area. It appears that some ferment is necessary to split up the huge molecules in which calcium is carried in the blood stream.

Hansberger and Fergerson have shown: (i) that there is an increase of the enzyme phosphatase in the serum of patients with fractures; (ii) there is a tendency to an inverse relationship between the concentration of phosphatase and that of inorganic phosphorus in the blood; (iii) that an increase in the concentration of the enzyme in the serum is found in certain generalized diseases of bone.

Practically all observers have agreed that there is no deficiency in the inorganic elements in the blood stream in cases in which delay in union occurs. The theory that the formation of new bone is dependent on the osteoblast now seems to be much less accepted, because it has been found that bone can be formed in any tissue independently of the presence of osteoblasts. It has been found that *fascia lata* transplanted into the bladder often ossifies. Lick showed that when the renal arteries were ligated bone was induced to form in the kidney in about three months, and if a flap of omentum with a good blood supply was attached to the kidney, bone was formed in about three weeks. From these experiments and clinical observations it has been suggested that there are two essential factors for bone formation: (i) a hyaline matrix in an area of retarded circulation (as a blood clot); (ii) a surrounding area in which there is a good blood supply.

It is obvious, therefore, that the local process depends on the integrity of the blood supply, which is derived largely from the surrounding soft tissue and to a very small extent only from the nutrient artery. The causes of non-union can be classed as: (i) those that interfere with the blood clot and (ii) those that interfere with the circulation.

A series of experiments by Dragstedt and Kearns led them to the following conclusions: (i) The rate of repair of a defect in a dog's femur is reasonably constant. (ii) Thyreo-parathyreoidectomy delays the healing of a bone defect, but does not prevent it. If, however, sufficient calcium is administered to keep the blood calcium level normal, the time of healing is not increased. Therefore the presence of parathyreoid hormone itself is apparently not necessary for the process of ossification. (iii) The effect of parathyreoid hormone is very complicated. In some cases the X-ray appearance suggests that it facilitates repair, as shown by early calcification of the callus; but the ultimate time of healing is not altered. Large amounts of the parathormone, however, cause a definite delay in healing; but the general condition of the dogs used by Dragstedt and Kearns was not good, apparently being upset by an overdose of the hormone. Therefore, they concluded that the administration of parathormone was not likely to facilitate bone repair unless there was a definite parathormone deficiency. (iv) Uncomplicated thyreoid deficiency does not appear to delay the healing of bone defect.

It must be agreed that the causes of delayed union and non-union are purely local—that is to say, that constitutional diseases have little or no bearing on the rate of union. Large numbers of cases have occurred in which fractures have united quite satisfactorily in persons suffering from rickets, Paget's disease of bone, syphilis and most other conditions. Even in *fragilitas ossium*, in which a fracture of the femur may be sustained while the patient is turning in bed, there is as a rule no delay in union, and there need be no hesitation in the performance of an osteotomy for the correction of the deformity in such a condition. It must be remembered that a person may sustain multiple fractures and satisfactory healing may occur in all but one. Again, there is the fact that delay is to be expected in certain bones, or more particularly at certain sites in certain bones. All these considerations, I think, prove that in searching for the cause of unsatisfactory healing of bones we may confine our search to the area involved.

The abnormality in bone in which union has not taken place may be regarded as a diminution of blood supply to the ends of the bone. The bone ends themselves are dense and brittle and very often covered by fibrous tissue. The periosteum loses its normal structure and is replaced by fibrous tissue.

Certain clinical observations also throw an interesting light on the causation and treatment of delayed union. Infection is never a bar to union, except the mechanical interference of a sequestrum between the bone ends; and in any case the infection itself usually acts as a powerful stimulant to callus formation, so that a massive involucrum is usually formed about the sequestrum. Severely comminuted fractures usually unite more rapidly than a simple fracture.

Great difficulty has been experienced in the laying down of a standard time during which union should take place in any individual bone. Of course we know that complete restoration of bone structure is usually a matter requiring

some years; but from a clinical point of view we may regard a bone fracture as having united when functional activity may be resumed without the use of any support. I was able to get no information at all from hospital records as to the length of time required for union, as no satisfactory records have been kept of fracture cases, nor is any satisfactory follow-up system in operation. However, for some years now I have myself endeavoured to follow up every fracture patient from the time of injury until he is fit to resume work. This record system has proved of tremendous value in improving the technique of treatment and allows a fairly accurate prognosis to be made in most cases.

The most striking feature of such series of records is that the length of time required for union is much longer than is usually allowed. Practically all the standard textbooks are ridiculously short in their estimates of the time required for union, and lack of proper fixation until union is complete is a primary cause of many cases of non-union.

SHOES AS A DEFORMING INFLUENCE ON FEET.[1]

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I AM most conscious of the honour of reading this paper, and I should like to dedicate it to the late Dr. E. B. M. Vance, to whom I am most profoundly indebted in the matter of static ailments of the feet. Dr. Vance frequently expressed a desire to publish his views and experiences of this aspect of orthopædic surgery, of which he was indeed a master, and we are the poorer that this has not been done. When I think how he would have presented this very important subject, I ask you to bear patiently with me.

It can be safely stated that the present generation in all its social strata lives on its feet and by its feet; this is the age of action and speed, and to be able to respond adequately to its demands the individual must not be conscious of his chief means of propulsion—the feet. How often these are ruined through ignorance, fashion and poverty only the orthopædic surgeon really knows.

The subject is vast and impossible to cover in all its aspects in the time available today, and therefore we must content ourselves by considering how the primarily normal foot, in itself a thing of beauty, can be converted into the most hideous monstrosity by many of the shoes now sold. Let us realize at this juncture (i) that static foot deformities do not occur in a week or a month, or by the wearing of one pair of ill-fitting shoes, but result from the continuously deforming influences of many of the popular shoes over the years, and (ii) that the young foot can tolerate ill-fitting shoes for many years without subjective symptoms, whilst the objective results of such maltreatment do, sooner or later, give rise to a large assortment of symptoms and deformities, even to complete invalidism.

Statically the normal foot can be briefly stated to be one which has an active dorsiflexion of 25° above the right angle when the knee is extended; whose *tendo Achillis* lies slightly to the inner side of the mid-point of a line between the tips of the medial and lateral malleoli; the anterior part of whose foot has a gradual adduction swing from the heel; whose toes lie in extension when at rest and continue the lines of their corresponding metatarsals; whose longitudinal arch is not too high nor too low; whose tarsal joints are nicely supple; and which takes the body weight on the pad of the heel, on the metatarsal heads (slightly more on those of the first and fifth metatarsals) and along the outer third of the sole of the foot. In the normal foot of a new-born infant the range of toe movements approaches that of the fingers and far exceeds that of the adult foot. One observes that loss of toe and tarsal movements begins with the wearing of shoes. Through this the intrinsic muscles gradually become atrophied and the joint capsules in many instances shortened to such an extent that the toes become merely rigid curled appendages at the end of the foot in elderly people, and recovery is beyond expectation. If we only maintained the function and power of our intrinsic foot muscles many complaints would be abolished and needless suffering avoided.

Let us now take a pair of infant feet, normal in structure and function, and encase them in knitted woollen bootees made by some well-meaning friend without any knowledge of foot form. Such bootees too often end in a point at the toes instead of being square and loosely fitting, and their immediate effect is the bunching together of the toes in this conical contrivance, with inhibition of intrinsic muscle action. The bootees are then washed, and, being of wool, they shrink; *pari passu* the tiny feet are growing at an astonishingly rapid rate, so that week by week the deforming influence is increased, and by the time the victim reaches the shoe stage we notice that the desire and ability to use those important muscles have considerably diminished. Now these feet are covered with socks, also in many instances ending pointedly, and these, if at all tightly fitting, continue the baneful effects of the bootees and to a more pronounced degree as they are of closer weave and of less resilient material.

This slowly deforming influence of socks and stockings is observed throughout life; it is especially pronounced in the case of many women's stockings, since to avoid wrinkles the stocking must be closely fitting, and as they are pointed to suit the shoe and not the foot, the great toe is held in valgus and the outer toes are nicely imprisoned in this diaphanous cage; should the second toe be longer than the first, it is carefully curled up in consequence. The young feet are then clothed in shoes without design, which one must examine twice before selecting the right from the left. Such shoes induce the foot to grow in a straight line at the tarsal joints instead of encouraging that gentle adduction curve we like to see, and at the same time they hold the toes tightly in flexion and adduction in many cases.

When the ambulatory age is reached the child must continue to have his feet deformed by more rigid shoes of similar type until his feet become large enough to wear a properly constructed orthopædic shoe. These relatively few people patronize, because, first, their importance is not known, and secondly, most people cannot afford the unnecessarily high prices charged for them. Since at least 75% of children's shoes should be made on an approved orthopædic last, it should be possible to retail them at a range of prices now current for the badly designed shoes. Most non-orthopædic shoes are too straight, and from the level of the metatarso-phalangeal joints both sides slope towards the tip; the result is that the feet and toes are encouraged to grow in that line and the great toes are forced into valgus at either the metatarso-phalangeal or the interphalangeal joint, the fourth and fifth toes especially are crushed towards the mid-line of the foot, and the longitudinal arch and adduction curve of the anterior portion of the foot are discouraged.

A common error is the wearing of footwear much too short for the foot, and often this is done without the wearer being conscious of it. Especially is this so in the case of children of poorer people, who cannot afford new shoes every few months, which are necessary for children; the result is that the toes become flexed and permanently deformed, and through the subconscious continuous contraction of the short plantar muscles adaptive shortening of the plantar fascia can be reasonably considered a sequela.

When the adolescent stage is reached fashion begins to play its pernicious part in the wearer's mind. The male frequently selects a shoe with a rather more pointed and shallow toe and with slim lines. For a number of years its ill effects pass unnoticed, as the tissues have good

[1] Read at the annual meeting of the Australian Orthopædic Association, March, 1940.

recuperative powers; but with the efflux of time those powers weaken, and we find ingrowing toe-nails; flexed toes with corns on the dorsum and sometimes on the tips of the toes, and in extreme cases corns and callosities beneath the metatarsal heads; sometimes *hallux valgus*; and not infrequently traumatic arthritis of the first metatarso-phalangeal joint and *hallux rigidus*, as a result of the summation of repeated minor concussions suffered by that joint through too short a shoe. The wearing of a straight shoe for many years forces the anterior part of the foot into relative abduction and increases the strain on the plantar ligaments; the capsized foot results. Many men, uninfluenced by fashion, wear incorrect shoes through ignorance; common faults are shoes too short and too narrow across the metatarsal heads and the toes.

It is incorrect to choose a shoe that fits the foot like a glove. Let the shoe grasp the foot from instep to heel and grip the heel from side to side; but let it fit the metatarsal heads and toes loosely, so that all toes are able to extend fully and to move freely in the shoe. If, when the wearer stands, the uppers are drum-like across the metatarsal heads, those shoes are too narrow; and if the toes are seen to produce eminences in the uppers, it is certain that they are being cramped through too short and pointed a shoe. Such narrow and short shoes also cause traumatic neuritis of a digital nerve through excessive lateral pressure, and this condition is usually relieved by wearing a sufficiently wide and long shoe and a metatarsal bar.

It is in the female of the species that one finds the most disastrous effects of standard shoes, and the thousands of grossly deformed feminine feet testify to the baneful influences which fashion produces in this regard. Many modern girls of fifteen or sixteen years are not content to wear a sensible laced shoe with a flat broad heel and ample toe room, but must emulate their older sisters and cram their feet into shoes much too short, narrow and pointed, with high heels, and of court style; in these their feet must perforce complete their growth, and in so doing adopt the shape of the shoe instead of the form nature intended. At the age of eighteen years practically all young women adopt the fashionable shoe described, and from this age onwards one can trace the course of events which finally renders the feet incapable of carrying out their normal function.

The height of the heel takes first place in this cavalcade. I consider that no heel should be higher than one and one-eighth inches, and that with every quarter inch added to this the foot is going to suffer proportionately. The average height now worn is in the region of two inches; and when one realizes that the majority of fashionable shoes have heels two and three-quarters inches high, one is not surprised at the unsightly gait which prevails in such a city as this. With this increase in the height of heels the *tendo Achillis* is encouraged to shorten itself adaptively, and this explains why so many women are unable to dorsiflex their feet above the right angle. Secondly, the tarsus and metatarsus are held for long periods almost in line with the leg, and consequently the body weight is for the most part borne on the metatarsal heads; whilst the toes, instead of continuing the lines of the metatarsals, are placed in a position of rather severe dorsiflexion. This long-continued trauma to the articular surfaces of the metatarsals and the overlying capsules and tendons produces great pain in this region; add to this the gradually diminishing ability to dorsiflex the foot, which in turn increases the stress on the anterior portion of the foot, and one is assisted in the analysis of many feminine foot disorders.

Now let us turn to the width of the shoe at the metatarsal heads. In practically all cases the shoe is one-quarter, one-half, sometimes three-quarters of an inch, and occasionally one inch narrower than the foot which is squeezed into it. Consequently the metatarsal heads are forced out of their correct alignment, and we find that the second, third and fourth heads are thrust downwards and are compelled to take an undue proportion of the body weight. This fact, combined with the effects of the high heel, produces callosities and corns on the soles, usually over the second and third metatarsal heads, enlarged bursæ and traumatic neuritis of the digital nerves, as well as corns, bursæ and exostoses on the medial and lateral sides of the first and fifth metatarsals respectively, the result of local direct pressure. Looking still further, we find that the shoes now come rapidly to a point, whereas the outlines of the normal foot invite the shoe to be slightly wider at the level of the toes than at the metatarsal heads, so that they may have room to carry out their function. Thus we see the great toe forced into valgus and the fourth and fifth toes crushed across and curled up until they become worse than useless appendages. Corns are produced on the dorsum of these toes, and on account of the constant jamming together in this deformed position soft corns develop on the contiguous surfaces. In addition, the skin overlying the margin of the great toe-nail is constantly under pressure between the shoe and the nail, the nail is deformed and the ingrowing toe-nail develops. In the majority of cases the shoe is far too short, and consequently the great toe is forced into still further valgus, the second and third toes are held in flexion, and the already deformed fourth and fifth toes are still further curled up; more corns result, this time on the dorsum of the second and third toes, sometimes at the tip of the toe, and not infrequently callosities and even corns form on the medial margin of the distal portion of the great toe; soft corns develop between other toes as a result of friction between the broad interphalangeal joint of one toe and the base of the neighbouring phalanx.

The flexion of the toe accentuates the dorsiflexion at the metatarso-phalangeal joints, which in turn increases the stress on the metatarsal heads; arthritis and periarthritis and even complete dorsal subluxation occur at the metatarso-phalangeal joints, and thus the stage is set for a full exhibition of foot complaints and deformities which need not have occurred.

Reference has been made to the court shoe. One can do naught but condemn it as a most dangerous appliance, as its retention on the foot depends upon its grip from the heel to the tips of the toes instead of from the heel to the metatarsus. In order to obtain this grip the shoe must be several sizes too small for the foot, and the above-mentioned deformities and complaints are greatly aggravated. Consideration of these points leads one to believe that, should humanity manage to reproduce itself for a sufficient number of years, the female members of the race at any rate will attain the goal for which they are so diligently striving—namely, a hoof instead of a foot; whether it will be cloven or otherwise I cannot foretell. When that happy day arrives, orthopædic surgeons will have lost the chief cause of their grey hairs, as it is an almost hopeless task to persuade women to substitute correct shoes for the deforming abominations they now wear, until they are so crippled that they simply must have shoes made specially for their grossly deformed feet—feet which even the most carefully designed standard orthopædic shoes cannot accommodate.

Before terminating this engrossing subject I should like to refer to that "last word in shoe salesmanship"—the X-ray fitting of shoes. Such examinations are made by salesmen and women who can have but scant knowledge of the shadows before them; the one thing they do learn by the X-ray apparatus is that the foot is in the shoe, and because the X-ray picture says as much, "the fitting must be correct". How much better it would be to palpate the foot through the shoes to determine the amount of tenseness imparted to the uppers and whether the toes are flexed or straight, and to ask: "Can you straighten, spread and move your toes in the shoe, and does the shoe feel loose about the metatarsal heads and the toes?" The answer should be "yes" in each case. Moreover, the length and width of the foot should be measured when it is carrying the full body weight.

In conclusion I venture the opinion that it is just as important to control the design of shoes in the interests of public health as it is to control the milk supply or infectious disease in the community.

TREATMENT OF LATE CONTRACTURES RESULTING FROM ERB'S PALSY.[1]

By ARTHUR MEEHAN,
Brisbane.

IT is first necessary to define precisely the condition under discussion. The term Erb's palsy is applied to that particular type of birth palsy in which the paralysis or paresis is confined to muscles supplied by the fifth and sixth cervical nerves. The actual muscles involved in the severe cases are the following: the deltoid, supraspinatus, infraspinatus, *teres minor*, *biceps brachii*, brachialis, brachio-radialis and supinator. In milder cases only some of these muscles are involved, but involvement of the deltoid, supraspinatus, *biceps brachii*, brachio-radialis and supinator is very constant.

It is now a well-established fact that the cause of birth palsy is a stretching of various elements of the supraclavicular portion of the brachial plexus during the process of birth. Sever's experimental observations on the cadaver strongly suggest that downward force on the shoulder with lateral bending of the head and neck to the opposite side leads to tearing in the first place of the fifth and sixth cervical nerves, and results in Erb's type of palsy. If the arm of the child is caught above the head and the body is forced or pulled downward, the lower cervical nerves are more apt to be torn, particularly the eighth cervical and first dorsal nerves. This leads to palsy of the lower part of the arm (Klumke's type), in which the intrinsic muscles of the hand are involved. In addition to the manifestations in the arm of this type of paralysis, changes in the eye pointing to involvement of the cervical sympathetic are sometimes present.

All these forms may be combined in the severest cases. The outlook is not good in palsy of the lower part of the arm or in the combined type of palsy. In palsy of the upper part of the arm (Erb's palsy) the prognosis is very much better; but complete recovery is by no means the rule.

An outstanding feature of Erb's palsy is the early development of contractures in the unaffected muscles of the arm. The attitude of an arm affected by Erb's type of birth palsy is characteristic and follows logically on the lack of power in the paresed or paralysed muscles: the arm hangs inert by the side as a result of lack of power in the supraspinatus and deltoid; the elbow is extended as a result of involvement of the elbow flexors; the back of the arm or hand is directed forward. This feature results from the unopposed pull of the internal rotators of the upper part of the arm, mainly the subscapularis; it is accentuated by loss of power in the supinator and to a less extent in the brachio-radialis.

The contractures, which quickly result if precautions are not taken to prevent them, are mainly in the following situations: (i) the subscapularis, leading to fixed internal rotation deformity; (ii) the *pectoralis major*, leading to fixed adduction deformity; (iii) the *pronator radii teres*, leading to a certain measure of pronation deformity. Actually flexion deformity at the elbow is apt to occur if paralysis of the elbow flexors is incomplete, and particularly if the elbow is left for a prolonged period in the flexed position without interruption. The planning of an attack on these contractures is the object of this paper.

Preventive Treatment.

Postural Treatment.

It is important for obstetricians who see these patients first to understand the general distribution of the paralysis, and above all to realize the contractures which are apt to follow quickly.

In taking the histories in long-standing cases one almost invariably finds that the initial treatment has been the placing of the affected member in the time-honoured sling; and I must admit that this is a natural instinct when the flaccid helpless arm is seen. An analysis of the position of the arm in a sling will, however, very quickly lead to the realization that in practically every respect it is the antithesis of the position which is likely to avoid contractures. The adduction of the arm to the side of the body, the internal rotation at the shoulder joint and the pronation, all favour the very contractures which it is important to avoid. The arm should be kept abducted and externally rotated at the shoulder and in supination. This can be readily achieved by an abduction splint. Such a splint should be promptly fitted; it is comfortable and well tolerated by the infant. As a somewhat rough temporary measure I would suggest that the arm be held behind the head by a bandage passing from the arm backward and under the opposite axilla.

After the fitting of an abduction splint it is most important that passive movements of the various joints in the arm be performed thoroughly in two daily sessions, preferably by a trained masseuse; this prevents troublesome stiffness. Some form of heating treatment will also assist in this objective. This form of treatment is particularly necessary to prevent fixed flexor contracture of the elbow joint.

Early Operative Exploration of the Injured Nerve Trunks.

Theoretically early operative exploration of the injured nerve trunks would seem to be the most logical method of preventing contractures, by initiating actual functional recovery in the injured nerves and thus restoring function to the paralysed muscles. Indeed it would on first thought appear to be the only method constituting a true surgical attack on the problem of birth palsy in general. Certain difficulties and objections have, however, prevented this method of treatment from becoming popular amongst surgeons. In the first place the most severe type of Erb's palsy may completely disappear in a few months without any surgical interference. In my opinion, the electrical reactions of the paralysed muscles afford no guide to the degree of recovery likely to occur. This leaves the time test as the only guide to prognosis.

Immediate or very early nerve suture would thus be a grave surgical error. If there is no sign of recovery within three months the indication for nerve suture seems more definite, and such a procedure has been advocated and practised. I have not been able, however, in a limited search of the literature, to find a convincing series of cases. Two surgeons who have advocated the method are Kennedy, of Glasgow (*The British Medical Journal*, February 7, 1903) and A. S. Taylor, of New York (*Surgery, Gynecology and Obstetrics*, May, 1920). Kennedy's series consisted of only three cases; improvement is claimed in only one. Taylor's series embraces 70 cases; his description of the operation suggests difficulty from extensive scarring and the presence of gaps between the nerve fragments. The final results are not convincing.

I have had no personal experience of this operation and must admit that the descriptions I have read up to the present do not tend to produce undue enthusiasm for it. Yet one cannot but admit that if a safe and satisfactory method of repair of the nerve damage were devised, it would constitute the most logical method of early surgical attack on this condition.

Treatment of Established Contractures.

It has to be noted that as well as the actual contractures two associated conditions which interfere with function at the shoulder joint sometimes occur in long-standing cases: (*a*) posterior subluxation at the shoulder joint, and (*b*) hypertrophy of the acromion process, leading to the development of a hook-like bony process extending forward and outward from the acromion. These two conditions must be overcome during the operation for relief of the contractures.

Three methods for late treatment of contractures have been devised. They are: (i) Whitman's method, (ii) Fairbank's operation, and (iii) Sever's operation. (i) Whitman's method virtually amounts to forcible manipu-

[1] Read at the annual meeting of the Australian Orthopædic Association, March, 1940.

lation of the shoulder joint. The contracted structures of the shoulder joint are stretched and the arm is then held in the corrected position. In cases of any duration the contractures are so severe that it is unlikely that manipulation alone would be able to overcome them. The field of application of this method must be a very small one. (ii) In Fairbank's operation the tendons of the *pectoralis major* and subscapularis are divided. The capsule of the shoulder joint and in some cases the coraco-humeral ligament and in others the supraspinatus tendon are cut. I have not found it necessary to open the capsule of the shoulder joint or to cut the other two structures mentioned. (iii) Sever's operation is an extension of Fairbank's operation and is the procedure which I have always adopted. An incision is made between the *pectoralis major* and deltoid muscles and the cephalic vein is retracted outward. The tendon of the *pectoralis major* is completely divided over a director. The coracoid process, with the attached tendon of origin of the coraco-brachialis and short head of the biceps is then defined, and the tip of the coracoid process just behind this attachment, but in front of the insertion of the *pectoralis minor*, is cut through and allowed to retract downward. The outer border of the tendon of the short head of the biceps is defined and pulled inward.

The freeing of the tip of the coracoid process and mobilization of the attached tendon have three advantages: (i) they help to free a flexor contracture at the elbow joint if one is present; (ii) they allow the arm to be placed well back and thereby favour reduction of any backward subluxation at the shoulder joint; (iii) they give an excellent exposure of the front of the shoulder joint and greatly facilitate the next step of the operation, which is the division of the subscapularis tendon.

I have observed in several cases that the tendon of the short head of the biceps is bound down by scar tissue to the anterior aspect of the shoulder joint and to the fascia in front of the axilla; this has made mobilization of the tendon difficult in those cases. I feel convinced that this scar tissue represents the healing of periarticular hæmorrhages occurring during birth. I also strongly suspect that this scar tissue corresponds to part of the so-called periarticular adhesions of the shoulder joint which commonly occur from trauma in adult life.

The adhesions in this situation cause the limitation of the movement of extension that is generally associated with the presence of periarticular adhesions. The definition of the tendon of the subscapularis is not absolutely simple, but Sever points out an anatomical feature which is of inestimable help. The two circumflex veins have been readily seen in all my cases, as they course round horizontally high up on the neck of the humerus. The lower border of the subscapularis tendon corresponds exactly with the upper of these two small veins. If the lower border is cleared and the arm is then abducted and rotated externally, a director can be passed under the whole tendon just before it merges with the capsule of the shoulder joint; it can then be easily divided over the director without the risk of opening the shoulder joint. A large deep cavity is left after these structures have been divided, and great care should be taken with hæmostasis in order that a large hæmatoma may be avoided. The use of a small drain for forty-eight hours is advisable. If an enlarged and hooked acromion process hinders correction of deformity, Sever advises fracturing the hooked portion. I have not had to do this in any of my cases.

With regard to subluxation of the head backwards, it has been my experience that freeing of contractures by the method described allows the head to come forward into normal position.

After operation an abduction splint holding the arm in the corrected position is at once applied and is worn continuously until the patient develops strong power to hold the arm against resistance in the corrected position. Reeducative exercises are commenced within ten days after the operation and are carried out twice daily. In my series it was seldom necessary to persist in splinting for longer than three months. If the splint is worn too long the patient is apt to lose the power of internal rotation, which in any case is weakened by division of the subscapularis.

The final results have been gratifying, though the arms, of course, have not been by any means normal. This, of course, would not be expected, as the operation is performed only in cases of severe residual disability.

The following outstanding features in the improvement have been: (i) power to abduct the arm strongly to an angle of 90° (seldom more) from the side; (ii) power to place the hand sufficiently close to the mouth to allow its comfortable use in feeding; (iii) power to place the hand to the same side of the head as the arm affected; (iv) power to carry the arm normally, instead of its hanging "back to front", as the patient's parents describe it. This feature is particularly noticeable as the child walks, and it appeals to parents even more than the actual gain in useful function.

The disappointing features in the results are the following: (i) failure in most cases to regain in full the movement of extension at the shoulder joint; (ii) a lack of the movement of internal rotation, which interferes with dressing; (iii) use of the paresed limb only when necessity arises, since the child has acquired great skill in using the sound arm. All the patients write by choice with the sound hand.

In forming conclusions as to the value of the operation, I have used only material based upon examination of the patients before operation and at various periods from two to fourteen years afterwards.

THE HOKE OPERATION FOR THE STABILIZATION OF FEET IN POLIOMYELITIS.[1]

By ELIZABETH MCCOMAS, M.D., M.Ch. (Orth.),
Melbourne.

IN presenting this paper on the Hoke operation for the stabilization of feet, I do not wish to imply that I always prefer this operation to the other recognized surgical procedures, including the best known of all, that devised by the late Mr. Naughton Dunn. As I am sure you will all agree, all qualified orthopædic surgeons, including those who have devised their own methods, will judge each foot on its own merit and will modify any standard method to suit best the patient under consideration.

In the last eighteen months I have been engaged in a survey of the present condition of all those patients who were treated at the orthopædic section of the Children's Hospital, Frankston, from its commencement at the beginning of 1930 until March 31, 1938. In view of my present work in connexion with the poliomyelitis cases from the recent epidemic of 1937 I have been particularly interested in those cases in which stabilization operations had been performed on paralysed feet. During most of the time included in this survey Dr. J. B. Colquhoun was in sole charge of this hospital, and I am greatly indebted to him for his help and for permission to present this series of his cases. In the first few years of his work at Frankston Dr. Colquhoun always used the Hoke method of stabilization as originally described by that author, and while of late years he has somewhat modified the procedure when he has considered it advisable, I do not think that I have included in this series any case in which the classical operation was not used.

Michael Hoke described his method of operation in *The American Journal of Orthopedics* in 1921. The feet suitable for this operation are those showing instability with or without fixed deformity, or those in which deformity other than calcaneus is the main disability.

For the operation to be considered a success the feet operated upon should possess the following characteristics: (i) They should look natural in shoes. (ii) They should be so stable that they do not turn laterally on the long axis of the foot when weight bearing. (iii) They must be

[1] Read at the annual meeting of the Australian Orthopædic Association, March, 1940.

TABLE I.

The Results of the Hoke Stabilization Operation in Thirty-six Paralysed Feet.

Patient's Name.	Original Deformity.	Age at Operation. (Years.)	Age at Survey. (Years.)	Result.
H.M.	Pronounced *equino-varus* of right foot.	14	18	Good; stable, with slight varus.
D.W.	Instability of left foot, with pronounced valgus.	12	16	Excellent.
E.H.	Instability of right foot, *calcaneo-valgus*.	9	13	Excellent.
E.P.	Flail foot (left).	13	15	Excellent.
B.S.	Both feet flail.	12	17	Right foot good; stable, with slight eversion. Left foot good; stable, with slight eversion.
P.F.	Instability of right foot, *equino-valgus*; instability of left foot, equinus and *metatarsus varus*.	15½	25	Both feet excellent.
J.H.	Both feet showed pronounced equinus, with clawing of toes.	11	13	Both feet excellent.
V.R.	——	—	18	Excellent.
L.P.	Instability of right foot, gross *calcaneo-carus*.	8	10	Bad; stable, but still pronounced *calcaneo-carus*.
J.P.	Equinus of left foot.	10	15	Good; stable, with slight adduction of forepart of foot and high arch.
R.P.	Instability and valgus of right foot.	13	21	Excellent, except for early *hallux rigidus*.
A.P.	Instability and equinus of right foot; instability and *equino-valgus* of left foot.	9	14	Left foot good; stable, with slight eversion. Right foot excellent.
L.C.	Instability of right foot, pronounced valgus.	9½	10½	Excellent.
A.D.	Both feet flail.	8	11½	Both feet excellent.
M.E.	Instability and *equino-valgus* of both feet.	13	21	Both feet fair; stable, with some valgus.
F.K.	Flail left foot, except for calf, giving pronounced equinus.	8	14½	Good; still some tightness, giving slight equinus.
E.A.	Marked instability, with *equino-varus* of right foot.	6	11	Fair; fairly pronounced adduction of fore part of foot.
K.C.	Instability and moderate valgus of right foot; pronounced valgus of left foot.	9	12	Left foot excellent. Right foot bad; further operation at the age of eleven years, but pronounced valgus still present.
R.C.	Flail left foot.	14	19	Excellent.
K.C.	Instability of both feet, with *equino-varus*.	6½	14	Both feet bad, with pronounced equinus. Owing to chronic ill-health, this boy has spent long periods in bed, possibly with feet unprotected.
V.T.	Instability of left foot.	14	21	Excellent.
A.G.	Pronounced *equino-varus* of right foot; instability and equinus of left foot.	9	16	Both feet good; stable, with slight varus.
B.W.	Pronounced varus on right side.	6	14	Good; stable, with slight varus.
G.W.	Both feet flail.	14	19	Right foot excellent. Left foot good; stable, with slight adduction of anterior part of foot.
E.C.	Both feet flail.	14	19	Right foot excellent. Left foot good; stable, with slight eversion.

so stable in the natural or nearly natural attitude that they do not need braces to hold them. (iv) When bare, they should not present gross deformity. To achieve these ends, Hoke considered that it was necessary to arthrodese the subastragaloid, the calcaneo-cuboid and the astragalo-scaphoid joints. Moreover, he considered that the X-ray films frequently showed that the neck of the astragalus was long, curved and a little hooked down, and that as the weight thrust was transmitted to the anterior part of the foot by the head of the astragalus in the direction of the neck, to obtain the best correction of the foot it was necessary to change the angle of the neck of the astragalus. In order to do this, he removed the whole of the neck and head of the astragalus with his wedge, obliterating the astragalo-scaphoid joint, and replaced enough of the head, denuded of cartilage, to bring the foot into the desired position. While I doubt whether this factor is present in the majority of cases, I think that it may be of importance in some cases. In long-standing cases of equinus deformity in young children it is quite understandable that the neck of the astragalus may become directed downwards, the anterior part of the foot being carried down with it.

Unlike Naughton Dunn, Hoke does not stress the importance of backward displacement of the foot in achieving stability, though there is always some backward displacement in obtaining bony apposition. Hoke does not remove the whole of the scaphoid bone and thus conserves the scapho-cuneiform joint.

From the series of cases that I am about to present, I do not judge that this lack of backward displacement of the foot has led to results inferior to those obtained by other well-recognized methods of stabilization, while if the scapho-cuneiform joint is retained, slightly more spring remains in the foot. With the smaller degree of backward displacement of the foot, the heel retains a more normal look and the patient is usually able to wear ready-made boots, which are often uncomfortable or even impossible on the long heel produced in other cases. This is also a factor of considerable economic value to the public hospital patient.

Results in a Series of Twenty-Five Patients.

I have in this series 25 patients, of whom 11 have had bilateral operations and 14 have had unilateral operations; this gives a total of 36 stabilized feet. Of these patients,

14 are wearing calipers, which would suggest that they do not conform to the third of Hoke's criteria of success. However, the reason for this has been the general muscle weakness of the leg and not any instability or deformity of the foot itself.

In assessing the results I have graded them thus: (i) "excellent": a stable foot in a neutral position; (ii) "good": a stable foot with slight recurrence of deformity, but not of a grade to interfere with weight bearing or to debar the patient from wearing ordinary footwear (for example, slight adduction of the anterior part of the foot or slight cavus); (iii) "fair": a stable foot, but with recurring deformity that is a definite disability, though not of such a grade as to warrant further operative interference; (iv) "bad": instability or deformity sufficient to warrant further operative interference.

The results are given in Table I.

It will be noted that all patients who had a bad result were operated on before the age of ten years, and I feel that this fact was largely responsible for the recurrence of the deformity. One bad result was in a case of *pes calcaneo-cavus*; I consider that the foot was never suitable for this type of operation. Another bad result was in a case in which poor general health and unsatisfactory after-care were a handicap.

According to my estimation of success, the results obtained were as follows:

"Bad"	4 feet	(11%)
"Fair"	3 feet	(8·5%)
"Good"	11 feet	(30·5%)
"Excellent"	18 feet	(50%)

Summary.

1. The survey shows a satisfactory number of good results obtained in paralytic feet by the Hoke method of stabilization.

2. The operation is not satisfactory for calcaneus deformity.

3. Such operations should not be carried out at too early an age, preferably not under twelve years; though in view of the number of successful operations in children a little under this age, they may sometimes be permissible if the deformity is gross or is causing great disability.

4. Adequate after-care is essential, and all such patients should report at regular intervals at least until all growth has ceased.

PARAARTICULAR CALCIFICATION OF THE SHOULDER: A SURVEY.[1]

By LAURENCE MACDONALD,
Sydney.

CODMAN, in his classic contributions to medical literature, ascribed to subacromial bursitis the major role in the causation of stiff and painful shoulders. His was a complete approach to the subject from the anatomical, the clinical, the pathological and the surgical aspects. His first paper was written in 1906, and it is interesting to note that in reviewing in 1937 the subject which he had made peculiarly his own, he paid tribute to the observations of an English anatomist, J. S. Smith. Smith, one hundred years previously, accurately described many of the attrition lesions of the shoulder joint, and his descriptions had been recently verified by many American anatomists. Codman, at the time he wrote his original monograph, was unaware of Smith's work. E. N. Wardle, in 1935, describing a case of calcification in the supraspinatus tendon, asserted that only 37 similar cases had been recorded in the literature. In actual fact, J. B. Carnett had in 1925 observed no less than 25 such cases, and Brickner had operated on a further 18 patients. Codman, in spite of his reference to specialists, may perhaps be excused for overlooking the publications of a co-worker who was so much his predecessor; but his experience points a moral: many medical truths are being constantly rediscovered.

My first inclination in preparing this paper was to collect clinical material and records from our hospitals, and from these to attempt to assess the results of treatment; but a brief review of the literature convinced me that all this had been done by many men much better qualified for the work. (For some reason which I am at a loss to explain, calcareous deposits in the region of the shoulder joint seem to occur much more frequently in America than in this country.) I have thought, therefore, that it would be of use to put before you a summary of opinion concerning calcification about the shoulder as an introduction to the discussion of your individual experiences in regard to treatment and opinions as to causation and pathology.

The clinical histories in these cases suggest a division into two main groups: (i) acute and (ii) chronic. In the statistics of the X-ray department at the Royal Alexandra Hospital for Children I could find no record of the condition commonly called calcifying subacromial bursitis, and in nearly all the reported cases the patients are aged over thirty years. Acute trauma appears to play a minor part in causation.

In the acute case pain and limitation of movement in the shoulder are the outstanding symptoms. The pain varies in intensity and may be so severe as to necessitate the administration of morphine for its relief. It varies considerably in its distribution in different individuals. Frequently it is referred to the insertion of the deltoid muscle on the outer side of the arm; but in cases of longer standing the pain may be referred from the neck all the way to the hand. The patients are unable to lie on the affected shoulder, and any movement of the arm increases the pain. Movement, particularly in the direction of abduction and rotation, is always restricted by pain and muscle spasm, while flexion and extension may be relatively full. A localized area of tenderness over the greater tuberosity is characteristic. This feature is useful in the making of a differential diagnosis from general arthritis of the shoulder. Muscle wasting is seldom noticeable, and it is exceptional for any rise of temperature to occur. Severe pain, after persisting for three or four weeks, usually subsides even in the absence of treatment, and in many cases recovery is complete. In a percentage, however, some disability persists, and pain is felt on certain movements or unaccustomed exercise over a period of years.

The chronic case, then, either begins acutely or is subacute from the commencement. Pain may be constant, intermittent or remittent over a period of years. Acute attacks may occur from time to time; localization of pain and tenderness is similar to that in the acute variety. Spontaneous recovery often takes place. Limitation of movement varies with the severity of the pain, and in cases of long standing the picture is complicated by the development of muscle contracture and periarticular adhesions from the adoption of an habitual posture of adduction and internal rotation of the arm. Recognition of these secondary changes is of importance in treatment, as full manipulation of the shoulder joint is indicated when operation is performed for the removal of a calcium deposit of long standing.

Pathology.

As orthopædic surgeons we are becoming more and more conscious of the fact that infection as the cause of many pathological processes with which we have to deal has occupied too large a place in our considerations. This particularly applies to pathological conditions in joints. We are coming to realize the extraordinary variation in the longevity of the same tissues in different individuals and of different tissues in the same individual, and we are acquiring a better understanding of the effects of purely mechanical factors in the causation of premature senility. In the condition under discussion the nomenclature still leaves much to be desired. An inflammatory bursitis associated with distension of the cavity is a

[1] Read at the annual meeting of the Australian Orthopædic Association, March, 1940.

distinct rarity in the subacromial bursa; and the term "calcifying subacromial bursitis" would appear to receive no support from a consideration of the pathology and should be eliminated.

The work of Codman, Howard, Meyer, Sandstrom and others has clearly demonstrated that calcification in the supraspinatus tendon is a mechanical lesion due to attrition. The appearance of a shadow in the skiagram is only one stage in a long-continued process, which may be symptomless throughout.

Codman, who was the first to recognize that the deposits were not in the subacromial bursa, but in the tendon itself, originally believed that they were due to acute traumatic rupture of the supraspinatus tendon, followed by the occurrence at the site of rupture of a hæmatoma in which calcium salts were deposited. Elmslie, in reporting eight cases in 1932, subscribed to this view; but in his analysis of the operative findings he stated that in no case was any obvious tear of the supraspinatus tendon or any necrotic tissue found. In only one case was there any evidence of inflammatory reaction in the subacromial bursa. In the acute cases he described a central yellow patch in the tendon of the supraspinatus muscle, looking like a thin-walled abscess, and obviously inflamed tissue all around. In one very acute case the central cavity contained blood; in its margin was the calcareous matter which was now crystalline and was embedded in masses of inflammatory cells, amongst which were a few giant cells resembling those seen in the neighbourhood of a foreign body. Around this central cavity lay fibrous tissue in various stages of development, containing acutely inflamed patches, in some of which more calcareous particles were present. There was nothing in any of the sections to suggest necrosis, and attempts at culture made at the time of operation were all without result. Analysis of the contents of one cyst showed it to consist of 116 milligrammes of calcium phosphate, 15 milligrammes of calcium carbonate, and 31 milligrammes of undetermined ash.

In his conclusions Elmslie stated that "no similar condition has been described elsewhere in the body, so it would appear that some local anatomical lesion is responsible for their occurrence". This statement is no longer true. In 1935 I. H. Maseritz reported the occurrence of acute inter-metacarpo-phalangeal calcification in a patient aged seventy-five years. The X-ray film disclosed a calcified mass, flake-like in appearance, situated in the space between the second and third metacarpal bones. The clinical findings pointed to an acute inflammation with calcification due to tendinitis of the interosseous muscle or possibly to calcium deposit in an inflamed inter-metacarpo-phalangeal bursa. A point of particular interest in this case is that one month after coming under observation the patient developed symptoms of acute subacromial bursitis, and X-ray examination revealed a deposit of calcium in the region of the bursa.

In 1936 Goldenberg and Leventhal described 30 cases of supratrochanteric calcification; 20 of these deposits were situated in the tendon of the *gluteus medius*, eight in the bursa between the *gluteus medius* and the great trochanter and two on the under-surface of the *gluteus medius* and not connected with the trochanter. In their summing up they state that the pathogenesis of the syndrome is analogous to that of the syndrome which occurs in the supraspinatus muscle at the shoulder—trauma, hæmorrhage organization and at times calcification and ossification.

Henry Melch and Howard Green, writing in 1938, described calcification occurring near the insertion of the *flexor carpi ulnaris* tendon into the pisiform. The calcific shadow might appear as a delicate lacework or in more solid masses. Conservative treatment was adopted, with prompt relief, the calcification disappeared and the symptoms subsided.

It would appear that attrition lesions in the shoulder joint are by no means uncommon in elderly subjects. These are due to the millionfold occupational traumata caused by pinching of the supraspinatus tendon between the grip of the humeral head and the acromial process or acromio-coracoid ligament. Acute trauma may play a part by determining rupture of the supraspinatus tendon; but most evidence is in favour of the cause of symptoms being a "tendinitis". Many intelligent patients cannot recall any history of trauma which might cause tendon rupture, and it is well known that calcium deposits may be present for many years without causing symptoms. It has been said that in 25% of the acute cases in which calcification is present in the painful shoulder there is also a deposit of calcium above the other apparently normal joint. The calcium may be deposited in multiple small foci, even up to 1,000 in number; this would be an unlikely sequel if rupture of the supraspinatus tendon were the sole cause.

Sandström and Wahlgren have made an exhaustive study of twelve radiographically diagnosed cases of what they call "*peritendinitis calcarea*", occurring in the region of the shoulder, hip, knee and ankle joints. The histopathological examination revealed deposits of calcium in the tendons and in the venous capsule as well as in the ligaments, the joint capsules and the periosteum. The histological picture suggested that the calcium deposit was secondary to necrotic and necrobiotic lesions which, in view of the pathologically altered arterial branches with narrowing of the lumina, the authors regarded as the result of a circulatory disturbance. Purely morphologically, however, the process can be regarded as an alterative inflammation. Barr has called this deposit of calcium in dead or dying tissues "dystrophic calcification".

Watson Jones in a recent publication describes the sequence of events as follows:

> With every abduction movement of the shoulder, particularly through the middle range of 60-120 degrees, there is friction of the supraspinatus tendon against the acromion process. As years go on, particularly in laboring men, the walls of the protecting bursa undergo attrition and the constantly repeated trauma gives rise to degenerative changes in the tendon and capsule. This degenerative supraspinatus tendinitis predisposes to calcification in the tendon.

The source of the deposit, like that of any other abnormal calcareous deposit, is avascularity of the tissues from preceding degenerative change. But the mass soon produces a secondary irritative hyperæmia which reverses the conditions under which it was formed. Spontaneous absorption is often observed and the hyperæmia may also cure the underlying tendinitis. Watson Jones regards the pain as mechanical in origin, owing to the fact that the calcium mass increases the impingement of the acromion process on the supraspinatus tendon.

Before leaving the considerations of the pathology of this interesting condition I feel I should mention three cases recorded by Stern in 1925. These patients showed all the characteristic clinical signs of acute subacromial bursitis, and opacities were visible in the skiagrams in the usual situation. Laboratory reports on the material removed called the substance amorphous fat, and all the chemical tests for calcium were absent.

There are to my mind many points in the pathology which still require elucidation. Absorption of the calcium deposit due to hyperæmia seems a reasonable possibility, and is supported by the clinical observation that such absorption does in fact frequently occur in chronic cases in which acute symptoms develop; but I have seen no satisfactory explanation of the fact, reiterated by many observers, that recurrence never follows spontaneous absorption or operative removal.

Before referring to treatment I should like to mention Carnett's method of radiologically examining the shoulder to throw the deposit shadow clear of the bone shadow. A clear space can be shown between the acromion and the humerus if the central ray is directed slightly caudally and laterally, an angle of about 10° from the vertical in each direction being used. One exposure is made with the arm in internal rotation; this is secured by flexing the patient's elbow and resting his palm on the upper part of his abdomen. The second film is taken with the arm in external rotation, the arm to the side, the elbow flexed, and the back of the hand on the X-ray table.

It seems anomalous, too, if this theory is correct, that forcible manipulation and vigorous massage should often

increase the deposit of calcium and the severity of the symptoms. In these cases the behaviour of the lesions resembles very much that of *myositis ossificans*. It is also beyond dispute that functional rest will frequently be followed by absorption of the calcium mass. Several observers have expressed the opinion that some factor other than trauma, probably a disturbed metabolism, plays a part in these cases.

Treatment.

Treatment may be summarized under four headings: (i) rest, with abduction of the arm; (ii) local infiltration with "Novocain"; (iii) puncture, or puncture with aspiration; (iv) surgical measures.

Rest with Abduction of the Arm.

Many patients, particularly women, have a rooted objection to operations, especially those which leave visible scars, and willingly tolerate an arm splint if this can be worn in the seclusion of their own homes. In my limited experience of supraspinatus calcification, treatment on an abduction splint gives prompt relief from pain. Abduction may have to be carried out gradually; but it is essential that the splint be worn constantly. The period of disability did not appear to be greater than in the reported cases in which treatment by operation was employed.

Local Infiltration with "Novocain".

N. J. Howard advocates local infiltration with "Novocain" in acute cases, but thinks that in chronic cases it is not effective. The region of the bursa is infiltrated with 15 cubic centimetres of a 1% solution of "Novocain". Subsequently the arm is kept in a sling, and diathermy is instituted. It is claimed that the relief of pain is immediate and the average period of disability is only four to five days.

Puncture and Irrigation.

In 1937 R. L. Patterson and W. Darragh described a technique for irrigation of the subacromial bursa in which two 18-gauge steel needles are used. About 60 cubic centimetres of saline solution are used for the irrigation. They also claim immediate relief of symptoms and a short period of disability. Their article is convincing, and I have thought it worth while to give the summary of their results, though it is doubtful whether their view of the pathology is correct.

One of the observations of Patterson and Darragh is of particular interest. They state that in several cases in which typical symptoms were present the skiagrams failed to reveal any calcium deposit, but upon irrigation of the bursa a gelatinous synovial type of fluid was washed through, which on chemical examination was shown to contain calcium.

In all, 63 patients were treated by irrigation; 48 of the lesions were acute (having been present for seven days or less), 8 were subacute (present for less than one month), and 7 were chronic (present for only one month). Seventeen patients gave a history of previous attacks. In 48 cases the skiagrams revealed shadows of calcium deposits. The average periods of economic disability were as follows: in the acute cases, four to eight days; in the subacute cases, seven to ten days; in the chronic cases, when relief was obtained, ten to fourteen days. The results were as follows: complete relief of symptoms was obtained in 57 cases; limitation of movement in the shoulder was present in two cases; operation was necessary after irrigation in two cases; pain and limitation of movement were still present in two cases. Many of these patients have been followed up over a period of thirteen months, and there have been no recurrences of symptoms.

Operation.

Surgical removal of the calcium deposit was early advocated and over a period of years has proved a certain method of cure. Most surgeons use an incision parallel to the fibres of the deltoid, extending downwards for two or three inches. In some hands this has resulted in some loss of power in the muscle, and these men advocated an approach along the anterior border of the muscle. The calcium is normally found in a small cavity on the superficial surface of the supraspinatus tendon, but it may be in the substance of the tendon or even beneath it. The deposits may be multiple. In long-standing cases a manipulation of the shoulder to break down periarticular adhesions completes the operation. A sling and abduction pillow are all that is necessary in the way of post-operative fixation. Relief of pain is immediate in acute cases; but some pain usually persists for several weeks in chronic cases. Most authorities advise active movements after the third or fourth day.

Summary.

1. Paraarticular calcification of the shoulder is evidence of ageing of the tissues due to "attrition"; but the possibility of a metabolic factor cannot be disregarded. The typical changes are paralleled in many other situations in the body.

2. The presence of a calcium deposit is not the only factor in the causation of symptoms and is perhaps of secondary importance.

3. Operation with removal of the calcium deposit is a certain method of cure, but physiological rest, injection of "Novocain" and irrigation with saline solution appear worthy of extended trial.

4. The immediate relief of acute pain by all the above methods would seem to indicate a vascular origin.

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Reviews.

DERMATOLOGICAL ALLERGY.

"DERMATOLOGIC ALLERGY", by Marion B. Sulzberger, according to its preface, is intended to be only a primer or introduction to dermatological allergy.[1] It is in the form of lectures delivered to beginners by the writer. The book is so carefully written, simple and explanatory and covers such a wide field that its study by any physician, dermatologist or even allergist would be to his advantage.

The first lecture deals with definitions of the new words used in the field of allergy, and states clearly that the word "allergy" includes all specifically acquired alterations, not excluding those in the direction of specifically increased resistance. A whole lecture is devoted to the skin as a protective organ, and the possible originator of allergic changes, and mention is made that the skin, as an organ, is three times as large as the liver. When an individual has been adequately exposed to certain microorganisms, virus or other allergens (and often regardless of whether or not this exposure has led to manifest clinical disease), the exposed individual's skin is likely to become specifically altered in its capacity to react. Such a specific alteration of the skin may persist. Eventually the individual will have in his skin a remarkably complete record of all microorganisms to which he has been adequately exposed. There are no organic changes, no tissue alterations, no symptom complexes or disease pictures, which are in and of themselves pathognomonic of allergy.

Eosinophilia is absent in tuberculin allergy, eczematous allergy and many drug hypersensitivities, and is present in *urticaria pigmentosa* (of nevoid nature), urticariogenic stimuli, intracutaneous injections of morphine, codeine, atropine *et cetera*. A manifestation can be proven to be allergic only when it can be conclusively demonstrated to be due to a certain agent or substance acting upon tissues or organs which have been altered in their capacity to react, and only when it can be shown that the alteration in the capacity to react is the result of previous exposure to the same or to an immunologically related agent. Some of the best examples are those of the allergies of infection—the positive reaction to tuberculin, to trichophytin, to oidiomycin. In these and others there is an altered capacity to react, which has actually been produced by previous exposure to the particular microorganism in question.

The first sign that the human being or animal has become sensitized may be seen in the so-called "flare-up" which appears at the site of the first application. There is a definite incubation period following the first exposure before sensitivity occurs; this may be from six days to six weeks, depending upon the substance to which the individual is exposed, and independent of the amount of inoculum. When sensitization has taken place, reexposure produces a "flare-up" in twenty-four to forty-eight hours (for example, sensitization to tuberculin, dinitrochlorbenzene *et cetera*).

When a dermatological patient presents himself one must be reasonably certain that the rash belongs to a category of cutaneous affections, which has at one time or another been proven to be based on allergy, and to place it in the proper group of allergic dermatoses. The next step is to search for exposure to any suspected substance, and in this a careful clinical history is of paramount importance. Skin tests to demonstrate hypersensitivity are next carried out, with further testing to prove that the hypersensitivity is specific, by carefully controlled measures.

Specific antibodies may be found in the patient's serum, but even these are not conclusive evidence that the dermatosis under consideration is allergic in nature, and, further, the absence of such antibodies does not exclude the allergic basis of a dermatosis. Oily substances, for example, the plant "oils", can become dissolved in the sebum, and are likely to produce contact type dermatitis. The dyes, paraphenylenediamin, anilin, azodyes *et cetera*, have a propensity to fixation to horny substances, and thus achieve a prolonged and intimate contact with the epidermal cells.

The type of test patch and intradermal test, the site of the shock tissue in the skin, the nature of causal agents, the type of reaction, tuberculin (delayed), urticarial (immediate), are discussed in Lecture V.

Eczematous contact type dermatitis is discussed at length, and a warning is given of improper or careless use of patch tests; indeed the use of this test by those not thoroughly conversant with its handling is contrary to the best practice of medicine. Absence of reaction to patch test demonstrates only that the particular site is not hypersensitive to the particular substance at the particular time. This state of the skin may be a temporary refractory period. Urticarial responses to skin test, urticarial skin diseases and atopic dermatitis, are all very confusing to the beginner; but Sulzberger simplifies the outlook considerably. Among the atopic dermatoses come infantile eczemas, and in these there is a family tendency to develop a certain characteristic type of sensitivity.

Manifestations of allergy in infectious diseases, allergy to tuberculin, fungi, insect bites, drugs, are given in detail. The common drugs producing skin reactions are listed, cosmetics are enumerated with the substances for patch testing generally and the percentage to be employed for the test. This list also gives a key to the industry or occupation where the substance is usually encountered. There follows a brief survey of treatment of the dermatoses. A complete bibliography is appended to each lecture.

The book is good, sound, common-sense reading, and is highly recommended for the use of all who are interested in the welfare of their patients. It is of both practical and academic value.

[1] "Dermatologic Allergy: An Introduction in the Form of a Series of Lectures", by Marion B. Sulzberger, M.D.; 1940. Baltimore: C. C. Thomas. Medium 8vo, pp. 565, with illustration. Price: $8.50 net.

STATISTICAL METHODS FOR MEDICAL AND BIOLOGICAL STUDENTS.

BOOKS on statistical methods are of two kinds: those which treat the subject formally and which build the methods on the appropriate mathematical foundation, and those which put the methods of statistics into the hands of the student without explaining how they have been developed. Unless he is a first-class mathematician, the medical man must be content to learn his statistics from the second kind of book, just as he is content to use drugs without a knowledge of how they are synthesized. A book on statistics for medical men need expect no more from its readers than a school knowledge of algebra and geometry; but the only way in which they can gain confidence and skill is by studying many worked examples and by performing numerous exercises.

Dahlberg's book falls neither into the mathematician's category nor the amateur's.[1] It has very few worked examples and no exercises. It assumes familiarity only with elementary mathematics; but it uses a symbolism which will be quite insurmountable to the doctor whose mathematics is five or six years old. For instance, to write the formula for the correlation coefficient as $\frac{I}{N}\Sigma\left(\frac{d_x}{\sigma_x}\cdot\frac{d_y}{\sigma_y}\right)$ is sheer pedantry; and to give probability integrals and trigonometrical methods for calculating a tetrachoric coefficient of "r" is sheer optimism. How many doctors consider (or would ever have considered) the following "an easy method" for calculating the correlation coefficient: $r = \sin e - v_1(1 - \cos e) + v_2(\sin e - e \cos e)$! As a mathematical treatise, on the other hand, the book is worthless.

Apart from these defects in presentation, Professor Dahlberg ignores the whole revolution in statistics of the last quarter of a century. The doctor must always deal with small samples—but the statistics of small samples as developed by Fisher, and especially for human populations by Haldane, Hogben and others, are not mentioned. Nor does the use of multiple correlation for the testing of significance find a place in the book. The numerous studies in the use of statistics in the genetics of disease in human populations are absent. In brief, if modern statistics were no more powerful a weapon than appears from Professor Dahlberg's book, it would be a waste of time for the doctor or the biologist to be bothered with the subject. The value of statistics is in fact so great (as books by Fisher, Snedecor, Hogben and others testify) that no research worker in biology or medicine can afford to remain ignorant of the methods. But to receive the necessary training the student must be directed to books other than that by Dahlberg.

[1] "Statistical Methods for Medical and Biological Students", by G. Dahlberg, M.D., LL.D.; 1940. London: George Allen and Unwin Limited; Australia: Angus and Robertson Limited. Demy 8vo, pp. 232. Price: 18s. 6d. net.

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THE URGENT NEED FOR ECONOMY.

THE careful attention of every reader is directed to the address by Sir Alan Newton published in this issue. Too much emphasis cannot be laid on the urgency of the position, and the warning on the need for economy in regard to medical equipment must be taken with the greatest seriousness. Practitioners are also advised to read the suggestions made by Dr. B. L. Stanton in regard to drugs manufactured in Australia (see page 481). Therapeutic efficiency will best be served in the long run by a thoughtful use of available drugs and the avoidance when possible of preparations that are scarce or difficult to obtain. Unless Sir Alan Newton's warning is heeded, the time will probably come when stocks of certain equipment will have disappeared and no more will be available.

THE PROTECTION OF THE SOLDIER IN WARFARE.

IN the olden days army surgeons went to the wars to dress wounds and by this means to save the lives of soldiers stricken on the field. As time went on it became clear that illness as well as wounds caused many deaths among soldiers, and the army surgeon turned his attention first of all to disease and its cure and then to disease and its prevention. As a result we find that in the medical history of the war of 1914-1918 almost as much space is devoted to medicine as to surgery, and that the promotion of health and the prevention of disease are the subject of long discussions. It is logical that if army surgeons are to be concerned with the prevention and the cure of disease, as indeed they must, they should be prepared to discuss any means that will lessen the severity of wounds or prevent their occurrence. In these circumstances no surprise need be expressed that the Royal Society of Medicine on June 26, 1940, held a discussion on the protection of the soldier in warfare. An account of this discussion, published in the *Proceedings* of the Society for July, 1940, has just reached Australia and should be brought to the notice of the medical profession and the authorities of the Defence Department.

The opening paper at the London discussion was read by Kenneth M. Walker. He began by saying that in 1918 he became deeply impressed by the frequency with which men in the front line were being killed by tiny splinters of grenade and shell that entered the front of the chest and ripped open the heart or the roots of the great blood vessels, causing almost instantaneous death. Splinters of this kind often had a low penetrating power, and many men escaped death through carrying in a breast pocket such articles as a cigarette case or a New Testament. Walker's opinion was at the time unsupported by figures; but he has since discovered a statement by Sauerbach that 37% of three hundred dead had wounds of the chest, and another by Loeffler that 29% of 469 were similarly wounded. In British casualty clearing stations chest wounds numbered only 3% among those admitted with wounds. Walker makes the obvious explanation for this low figure that the great majority of chest wounds are immediately fatal. He then reveals that he suggested to general headquarters that stationary men, such as front-line sentries, should carry in a pocket at the back of their respirators a steel plate curved to the front of the chest. He thought that by a suitable attachment this plate could be fixed to a wooden handle so as to form an excellent entrenching tool. "This memorandum eventually found its way into the hands of an official with wide vision and force, Mr. Winston Churchill." As a result, Walker was recalled from France and attached to the Ministry of Munitions as an expert in light armour. Warfare is much more mechanized now than it was in 1918, and Walker is advocating the adoption of some protective measures. He points out that we now have available steel of a tensile power much greater than was formerly available. The old objection therefore no longer holds that the weight that soldiers have to carry on the march makes armour impracticable. The man whom Walker wishes to protect does not march; he is carried in a lorry, on a motor bicycle, on a gun carrier or in an aeroplane. The velocity of projectiles presents wide variations. Those of low velocity travel up to six hundred feet per second, those of medium velocity up to twelve hundred feet per second, and those of high velocity are above this figure. Walker makes the very reasonable statement that once the principle is accepted that protection of the head against missiles of low and medium velocity by a steel helmet is worth while, there is no reason why, in the more highly mechanized units, this protection should not be extended to other vital areas, such as the chest and abdomen. He has planned a jerkin which will cover the whole abdomen and chest, and which weighs only 14 pounds. This protective shield will stand up to projectiles of low and medium velocity; these include an indefinable percentage of fragments of shell and bomb, but do not include rifle and machine-gun bullets under a range of 1,000 yards. Walker points out that if protection from high velocity missiles is required, this can be achieved by the reduction of the area protected to the front of the body and the addition of a couple of pounds of weight. He adds that other materials besides steel may be used, and that these may be moulded to any form and at reasonable cost.

Armed with all the knowledge that he could acquire, and fortified by the fact that the army authorities in the United States of America are actually using the steel that he has described, Walker has "spent the last month in and out of the War Office and the Air Ministry". The latter is, he states, keenly interested in the question of protection and is doing a great deal to protect its pilots and gunners. The War Office is "entirely unresponsive", and when questioned about maximum weight of body armour and the minimum requirements of protective power, has replied: "We are not interested in the subject." Walker adds: "Either I am entirely wrong in my conclusions that more can be done to protect specialized units of the British army, or else I am entitled to the support of the profession in my efforts to induce the War Office to reconsider its decision. If I am wrong, the German staff is also wrong. We are told that their shock troops are protected . . ."

The discussion that followed the reading of Walker's paper was interesting. Sir Richard Cruise spoke of the protection of the eyes and said that he had invented a visor of great simplicity and effectiveness. It was moulded so as to fit the inner curvatures of the steel helmet, to which it was attached by rivets. He wished to have this "essential portion of, or complement to the steel helmet" attached in future to all helmets. Sir Harold Gillies referred to the protection of the hands from burning by a gauntlet made of fire-resisting material. Colonel Max Page said that he was not quite sure that the armour should not be on the vehicle instead of on the back, and he reminded those present that although the fighting man should be protected to the utmost extent, he should not be hampered in any way. Sir Thomas Dunhill supported the views expressed by Walker. The question to his mind was how to give soldiers protection without impeding their mobility. Discussing the small size of shell fragments found in this war as compared with the last, he said that in this war of rapid movement it was probable that a far higher proportion of the more seriously wounded were not collected, whereas the more lightly injured had a greater chance of getting away. Into this chorus of approval T. B. Layton introduced, if not a discordant note, at least one of warning. He was opposed to any additions to the weight of equipment. He pointed out that Allenby had put 70,000 men in Beersheba. Walker's fourteen pounds for these men meant 400 tons or 40 ten-ton lorries. He raised the questions of petrol supply and depots, and he said that if these figures and problems were multiplied for the whole army, it was obvious that medical authorities would have great difficulty in getting the suggestion past the Quartermaster-General. At the same time Layton was interested by the protection afforded to the soldier who had something in his pocket covering the vital area of the heart. If Walker could suggest something weighing about two ounces, it might be possible to secure its adoption. Aslett Baldwin thought that an apparatus lighter than 14 pounds might suffice, and John Bunyan suggested a method which would give increased protection with less weight. E. D. D. Davis spoke in praise of the British tin hat, and McAdam Eccles agreed that real protection was wanted, even if it involved greater weight. After all, the equipment would not have to be carried very far, and at any rate not by the men themselves. After Kenneth Walker had replied, the following motions, which were proposed from the chair, were carried unanimously:

> (1) That this representative meeting of the Royal Society of Medicine, after a full discussion of the question, is emphatically of the opinion that the physical protection of the members of the fighting forces can and should be improved by a closer collaboration between the medical profession and the appropriate technical experts of the Admiralty, War Office and Air Ministry.
>
> (2) That this meeting of the Royal Society of Medicine resolves that the Council of the Society be asked to consider the formation of a special committee to this end, according to By-law 21; furthermore, as the matter is, in the opinion of this meeting, one of extreme urgency and importance, it is hoped that the President may use his emergency powers and approach the Government with the offer of the Society's co-operation at the earliest possible date.

The foregoing is little more than an abstract of the discussion that took place at the meeting of the Royal Society of Medicine. Several facts emerge, however, which should be brought to the notice of those who have power to act. The first is that by relatively simple means additional protection against missiles of a certain type can be afforded to the fighting man, be he sailor, soldier or airman. The second point is that the matter is one of difficulty, not only as T. B. Layton showed in regard to transport and storage facilities, but also because the War Office has persistently turned a deaf ear to Kenneth Walker's protestations. It was typical of Mr. Winston Churchill that during the last war he should be prepared to take notice of Walker's memorandum. At the present time he cannot be expected to do everything, and it is a pity that his open mind and his keenness have not descended, as did Elijah's mantle of old, on the Elishas of the War Office, whose eyes are sealed and whose ears are stopped. The third point, and one that needs to receive wider recognition in Australia, is that medical men, and particularly those holding high office in the Army Medical Corps, have something to offer to the cambatant forces.

Current Comment.

VITAMIN C.

THE story of scurvy has by no means reached its final chapter. In the past there has been a succession of clinical and administrative successes followed by failures, of hopes achieved and optimism frustrated. When in 1875 His Majesty's ship *Alert* put into port with many of the crew scorbutic despite the regulation allowance of lime juice which had been used prophylactically for some seventy years, the medical world received rather a shock. Subsequent inquiry showed that some time about 1860 the Admiralty gave up the old-fashioned lime juice, which was mostly lemon juice, and, true to the tradition of the sea, accepted a cheaper contract for a lime juice prepared from wild unpalatable limes. The lime juice ration still remains in the British Navy and mercantile marine, notwithstanding the fact that the antiscorbutic properties of this preparation are negligible. Various other prophylactic measures have been suggested and put into practice, such as the administration of ascorbic chocolate, ascorbic jam and antiscorbutic tablets where pure vitamin *C* has been deliberately added to the ration; but one gathers that the results of such medication have not been favourable and that reliance has been lately placed to an increasing

degree on an extended use of fruit and vegetables in the diet.

Some two years ago a number of observers, including some in Queensland, announced an anomalous condition in which the concentration of vitamin *C* in a vegetable food was actually increased by cooking. This peculiarity was ascribed to the presence of a substance, ascorbigen, which is changed into vitamin *C* by boiling. Professor Peter Holtz, of the Rostock University, has recently investigated this matter with a collaborator, Christian Reichel.[1] Their main conclusion is that ascorbic acid can be combined with protein and escape detection by the usual tests and that from this union it can be released by any hydrolytic agent, best in laboratory practice by boiling for ten to fifteen minutes with half normal hydrochloric acid in the absence of oxygen. Potatoes, carrots, apples, onions, celery and *Sauerkraut* contain appreciable quantities of bound ascorbic acid, or protein ascorbate as it might be termed, whereas cauliflower, radishes and beets hold liberal amounts of the free and little or nothing of the combined.

Two notable contributions to the clinical investigation of vitamin *C* deficiency have recently been published. John H. Crandon and Charles C. Lund, surgeons of Boston, collaborating with Professor D. B. Dill, professor of industrial physiology in Harvard University, undertook a detailed investigation of the results of vitamin *C* deficiency in the human.[2] Dr. Crandon acted as the guinea-pig in the research and subjected himself for six months to a diet containing every known essential ingredient of human food except vitamin *C*. The examination of pathological conditions was conducted with that comprehensiveness and attention to detail which we are accustomed to expect from an American medical research institute. The first abnormal clinical sign, hyperkeratotic papules, appeared after 132 days, whereas perifollicular hæmorrhages took 161 days to become manifest. The concentration of ascorbic acid in the plasma fell rapidly to zero; but the remarkable fact emerged that this plasma zero remained for thirteen weeks before any evidence of clinical scurvy was apparent. Obviously determination of vitamin *C* in the plasma is of little diagnostic value. On the other hand, the vitamin level in the white-cell-platelet layer of the centrifuged blood was shown to be a much better index. Good normal healing was noted after the plasma ascorbic acid had been zero for forty-four days; but failure of wound healing was very obvious when the ascorbic stores of the body generally were depleted, and microscopic evidence confirmed the view already put forward that lack of intercellular substance is largely responsible. With good pre-existing oral hygiene there were no gross changes in the gums or teeth; but X-ray examination of the teeth showed interruptions of the *lamina dura* at an early stage, and this has been suggested as a possible diagnostic sign. There was no anæmia or loss of blood complement. The results of the Göthlin, Dalldorf and Rümpel-Leeds tests were all negative. Blood pressure remained normal, except when the scorbutic conditions were severe, and muscular work could still be carried out. A full restoration of health followed intravenous injection of ascorbic acid, pointing clearly to the fact that this substance is the true vitamin *C*.

The other important contribution to our knowledge of scurvy was made by F. W. Fox, L. F. Dangerfield, S. F. Gottlich and E. Jokl, four research workers in South Africa.[3] Two groups, each of 950 mine labourers, chosen so as to be as comparable as possible in all respects, were subjected to an experimental test lasting seven months, one group acting as a control remaining on the usual mine diet, which was estimated to give 12 to 15 milligrammes of ascorbic acid per day, whilst each member of the other group received an additional 40 milligrammes of ascorbic acid daily. With the exception of twelve cases of scurvy in the untreated and one mild case in the treated group, no differences were displayed. General health, muscular power, condition of gums and teeth, recovery from disease and healing of wounds were as marked in the untreated as in the treated. It was also demonstrated that the concentration of ascorbic acid in the plasma can be extremely low without any clinical evidence of scurvy or detectable departure from normal in the body; and this confirmed the American findings mentioned. The daily requirements of the human being in ascorbic acid have been variously estimated at from 25 to 100 milligrammes. If the metabolism of the African native is a guide to the white man's needs, the lower figure would appear to be correct.

[1] *Klinische Wochenschrift*, May 18, 1940.
[2] *The New England Journal of Medicine*, September 5, 1940.
[3] *The British Medical Journal*, August 3, 1940.

PECTIN-AGAR FOR INFANTILE DIARRHŒA.

SINCE the apple diet was introduced for the treatment of diarrhœa in infants and children efforts have been made to produce something more refined than mere raw apple and therefore more suitable for feeding to babies who have not yet been weaned. Most workers have attributed the value of raw apple to its pectin content. P. J. Howard and C. A. Tompkins[1] have designed a mixture of pectin 6·3%, agar 4·3%, and dextrimaltose 89·4%. This is claimed to be an easily digested nutritious food which mechanically produces formed stools, favours normal peristalsis, absorbs and adsorbs bacteria and their toxins, combats ketosis and promotes local healing.

The mixture is in the form of a powder. For babies less than six months of age it is prepared by cooking eight ounces of the powder in a double saucepan for ten minutes with twenty-four ounces of milk. While still warm, the resultant mixture is poured into the feeding bottles in the required amount for each feeding. On cooling it sets as a gel, which readily liquefies on rewarming and shaking, and can then be fed immediately to the baby. The food value of the mixture is 40 calories to the ounce—twice that of usual milk mixtures. So the amount given is only half the usual feeding of the baby, the fluid requirement being made up of boiled water between the feedings or by saline clysis if necessary. The thick low volume feeding is claimed to reduce the tendency to vomit, so trying in these babies. For children of six months to two years of age the eight ounces of powder are cooked with only sixteen ounces of milk, water, fruit juices or such fluid. Any preferred flavouring may be added and the food given warm as a liquid or cold as a jelly. The children are allowed as much of this food as desired, different flavourings being used to prevent monotony. In addition, nothing but boiled water is given until the stools are formed and normal. When the stool is formed and free from blood, mucus and pus, the nursling is gradually returned to a standard milk mixture and the older child to gelatin desserts, toast, banana, apple *et cetera*, milk, vegetable and cereal being introduced with caution.

The response by new-born infants with pyrexia and diarrhœa with blood and mucus to such a routine is described. All responded remarkably well, having formed stools in forty-eight hours. The average duration of liquid stools was 1·6 days, contrasting with 4·7 days in a comparable control group fed on other standard mixtures. In the group fed on pectin-agar there was sometimes actual gain in weight during the illness. Older children were usually treated at home with rapid and satisfactory results. The children were much happier and recovery much more rapid than with the starvation routine so widely used.

The claims made by the authors for their food may sound excessive; but the results are satisfactorily presented and the treatment is rational. The dextrimaltose is easily digested, antiketogenic and nutritious; the agar gives bulk to the stool and diminishes rather than increases the excited and often painful peristalsis of the unhealthy gas-filled bowel; the pectin seems to have a detoxifying and absorbent action, and in addition may be hæmostatic. If the results achieved can be maintained, a very important advance has been made in the treatment of a grave disease of infancy.

[1] *The Journal of the American Medical Association*, June 15, 1940.

Abstracts from Medical Literature.

DERMATOLOGY.

Erysipeloid.

R. B. CRINNAN AND W. B. MARTIN (*Archives of Dermatology and Syphilology*, June, 1940) discuss erysipeloid and report a case of generalized infection. Erysipeloid is most frequently an occupational disease. It occurs in those who handle fish and crabs, in veterinary surgeons, butchers, cooks and bone button workers. It may occur in anyone who injures himself working with fish or with putrid or dead and decaying matter. In swine it is always a systemic disease presenting three types—the mild, the severe and the chronic. In human beings the localized form is the most frequent type of the disease. The incubation period is four days. The first evidence of infection is local redness, pain and swelling at the site of injury, such as that caused by the prick of a fish fin. Erythema and swelling quickly spread by contiguity and by the lymphatics, and produce a purplish red area with a clearly defined slightly raised border. As it spreads it fades in the centre; the borders are always sharply demarcated. It is tender and warm to touch. Pain as a rule is described as burning; it is usually mild, but may be intense. Suppuration never occurs. The disease may last five days to two months or longer. Migration of the infection is characteristic and it may recur in another place. The organism responsible is a pleomorphic Gram-positive coccobacillus called *Erysipelothrix* Rosenbach. The treatment of local lesions is by rest, moist heat and immune serum for the more serious conditions. The authors describe a case of generalized infection in which fresh areas of cutaneous involvement developed in distant parts of the body not directly connected by lymphatic drainage with the original focus. The organism was eventually isolated from the gall-bladder. Treatment by sulphanilamide was apparently ineffective; but the use of antiserum produced definite improvement both in the general symptoms and in local lesions of the skin. It was not until the gall-bladder was removed that the patient completely recovered.

Industrial Dermatitis from Gloves.

W. D. NORWOOD AND E. E. EVANS (*The Journal of the American Medical Association*, April 20, 1940) discuss the effect of dermatophytosis. They have tried to determine the relative importance of leather gloves and dermatophytosis of the feet in the production of a particular type of dermatitis of the hands of workmen engaged in manufacturing tetraethyl lead. The men wear leather gloves, which are dipped in a solution of soap chips and glycerine to make them impervious to any spill of tetraethyl lead. After work they wash their hands in a linseed oil base liquid soap. The rash on the hands varied from a slight non-inflammatory vesicular dermatitis of the webs of the fingers and dorsum of the hands to a severe eczema with exudation, crusting, fissuring and scaling. Tetraethyl lead is handled in a closed system and there are no authentic reports of dermatitis due to this cause. Patch tests with the liquid soap and linseed oil were made on the affected men and on controls with no lesions. Fewer positive reactions were obtained with the men affected with dermatitis than with those used as controls. On the men being instructed to wear oversize leather gloves, with cotton gloves underneath, the latter being washed every other day, some improvement but not complete cure was noted. The group of affected men were then examined for dermatophytosis of the feet and all were found affected; the diagnosis was confirmed microscopically and by culture. A combined treatment of feet and hands was then conducted, the following powder being used on the feet: salicylic acid 5 grammes, menthol 2 grammes, camphor 8 grammes, boric acid 50 grammes, and starch 35 grammes; a soothing lotion was used on the hands. Complete cure resulted in some cases and marked improvement in others; in all of these the condition had been resistant to treatment. The authors concluded that the lesions on the hands are due to two factors: (*a*) leather gloves traumatizing the skin through friction, heat and excess perspiration, and (*b*) dermatophytids sensitization rash from dermatophytosis of the feet. For the dermatitis thus produced the authors suggest the name "leather glove phytids".

Use of Urea in Treatment of Verruca Vulgaris.

E. M. MACKAY (*Archives of Dermatology and Syphilology*, April, 1940), from his observations that strong aqueous solutions of urea had considerable virucidal power on the viruses of rabies and infantile paralysis, was led to examine the possibility of their usefulness in the treatment of common warts. He reports that the results of urea treatment of warts have been good. He injected 0·1 to 0·3 cubic centimetre of a 50% solution of urea intracutaneously at the site of each wart, an attempt being made to get at the base of the wart but not far beneath it. In every one of the first six patients so treated the warts were completely removed. The treatment of sixteen more patients by colleagues was successful in 50% of cases. Some required a second injection; others were completely resistant. The exact site of injection may prove to be important. Injections always lead to some discomfort, but only rarely to pain of any consequence. The pain was most severe in the treatment of warts at the nail edge. The author states that urea was tried for its virucidal effect, but that it is uncertain whether this virucidal action is the mechanism involved in the removal of the warts.

Keratosis Blenorrhagica.

F. C. COMBES, C. DIETRICH AND J. COHEN (*The Journal of the American Medical Association*, May 25, 1940) consider that the cutaneous reaction in *keratosis blenorrhagica* is an allergic expression of a sensitized skin. The onset of *keratosis blenorrhagica* is insidious and follows on chronic or recurrent attacks of gonorrhœa. Chills and fever herald the appearance of each crop of new lesions. The distribution is symmetrical, with a predilection for the soles, palms, genitals and groins; less often the scalp, dorsum of the hands and feet are affected. Lesions on the palms and soles consist of vesicles, pustulation and crusting with associated keratoses. The lesion at its inception is an erythematous macule, the size of a pin's head to that of a circle one centimetre in diameter. It then becomes papular, thickened, waxy and almost translucent; in the centre a yellow spot occurs, giving it an umbilicated appearance. Often grouping and confluence of the papules occur, forming circinate and serpiginous patches. Half the sole may be covered with one of these caked heaped-up serosanguinous plaques. The nails have heaped-up waxy material under the distal end of the nail plate, clinically like that seen in arthropathic psoriasis and favus. Local treatment is of little value. Autogenous and stock vaccines are helpful. Drainage of obscure foci and treatment of the primary focus is most important. Sulphanilamide and sulpharsphenamine have been administered with inconstant results. The most effective treatment is by artificial fever produced by various means—for example, by intravenously injected typhoid vaccine, by the blanket method and by inductothermy. Under this treatment visible signs disappear in a week. Early relapse occurs if the primary focus is not treated. Cure was effected by inductothermy when a temperature of 106° F. was maintained for three hours at weekly intervals, two or three treatments being necessary. The authors' conclusions are: (i) *Keratosis blenorrhagica* is a distinct entity characterized by polyarthritis and cutaneous keratoses in the presence of a gonorrhœal infection. (ii) Fever therapy by means of the inductotherm appears a method of treatment superior to any previously suggested.

Rotenone in the Treatment of Scabies.

CARMEN C. THOMAS AND EVELYN E. MILLER (*The American Journal of the Medical Sciences*, May, 1940) have used a lotion containing 1% or 2% of rotenone (a well-known veterinary and agricultural parasiticide and a common constituent of flea powder) in a non-oily, emollient, liquid vehicle, namely, a mucilage of quince seed and Irish moss, for the treatment of scabies. Immediate relief of itching was obtained even when the skin was severely irritated, cure of light infestation was complete in two days and of severe infestation in a week, the patients were not conscious of the presence of the lotion on the body, and there was no odour or staining of the clothes.

Excretion of Sulphanilamide through the Skin.

T. CORNBLEET (*Archives of Dermatology and Syphilology*, May, 1940) has investigated the excretion of sulphanilamide through the skin. Five dogs were given 25 grains (1·62 grammes) of sulphanilamide with a stomach tube. Samples of skin and blood were taken one hour, twenty-four hours and forty-eight hours later. The average results obtained showed that in one hour the blood contained 8·8 milligrammes of sulphanilamide per 100 cubic centimetres and the skin 2·76 milligrammes per 100 grammes; in twenty-four hours the blood contained 4·4 milligrammes per 100 cubic centimetres and the skin 2·09 milligrammes per 100 grammes. In forty-eight hours the blood contained a trace of the drug and the skin no appreciable amount. Experiments were also conducted with ten persons who received sulphanilamide in various doses and over several periods; the patients were sweated at times from fifteen minutes to twenty-four hours

after ingestion of the last dose. It was discovered that the drug found its way into the sweat almost at once, just as it does in other secretions. Only fifteen minutes after the ingestion of moderate doses of the drug appreciable quantities appear in the sweat. As sweat dries on the surface the drug becomes concentrated. The extent of the accumulation on the skin and the rate at which the drug is removed by exfoliation are not known. High enough concentrations to deal with the organisms of impetigo and ecthyma would not be available; but they would be available, however, for the more superficial streptococcids of the ear, the scalp and the cutaneous folds. No evidence was found in the experiment on dogs that sulphanilamide accumulates in the tissues. Untoward reactions from sulphanilamide occur with sufficient frequency to justify the withholding of its use in the treatment of simple affections of the skin that respond to less dangerous applications and drugs.

UROLOGY.

Urinary Acidification by Intravenous Medication.

R. ASCOLI (*Journal d'Urologie*, September, 1939) recalls the importance of making the urine acid, especially in cases of alkaline lithiasis, and he also recalls the important fact that such acidification is sometimes impossible when attempted by the oral administration of drugs. He has searched for a suitable intravenous medicament, which would be (*a*) innocuous, (*b*) an energetic acidifier, and (*c*) cheap. He considers that all these conditions are fulfilled by mono-sodium phosphate. The concentration is usually 30% in distilled water. The solution should not be sterilized by heat, but the distilled water is first sterilized and the salt is added under aseptic conditions. Monosodium phosphate is also called bi-acid sodium phosphate. The injections are painless and not followed by any inconvenience. The injection should be given slowly and at first only in small doses—for example, five cubic centimetres. The injections are repeated daily and the amount is increased up to 30 or even 50 cubic centimetres. The acidifying action is almost immediate, and reaches its maximum in half an hour, after which it tails off slowly. The object being attained, the cure can be reinforced by oral administration of suitable antiseptics.

Cystomanometry in Clinical Practice.

M. PIOLTI AND L. MIGLIARDI (*Urologia*, June, 1939) defines cystomanometry as the measurement of intravesical pressure, and, more precisely, the study of the modification in tone of the vesical musculature at various stages of vesical filling. The authors do not favour the term "cystometry", adopted by American writers. The particular clinical application is in cases of functional vesical lesions consecutive to lesions of the nervous system. In clinical practice a mercury manometer is more suitable than the cumbersome water manometers. The simple design finally adopted by the authors was that of a mercury column graduated from 0 to 200 millimetres with a little cushion of air interposed between the mercury and the vesical fluid. The fluid is introduced by a large syringe connected with a three-way tap. Small successive quantities (25 to 50 cubic centimetres) of weak oxycyanide of mercury solution are injected very slowly into the bladder, and after each injection the pressure is noted. Particularly is noted the first slight desire to urinate. The injections are continued until the desire is imperious. The patient is then invited to urinate, and the maximum pressure obtained during these willed attempts at micturition is noted. Fallacies due to the addition of abdominal pressure during the estimation of pressure can be avoided if no notice is taken of sudden rises of short duration. Normally, the first desire appears with about 150 to 250 cubic centimetres of introduced fluid and a pressure of 12 to 15 millimetres of mercury. Urgent desire appears with 400 to 550 cubic centimetres of fluid and a pressure of 35 to 40 millimetres of mercury. The maximum voluntary pressure (of the detrusor alone) is about 60 millimetres of mercury. In *tabes dorsalis* pronounced hypoæsthesia and hypotonicity of the bladder are present. In disseminated sclerosis and pyramidal tract lesions the opposite condition is noted. Interpretation of slight alterations of vesical tone and sensitivity is more difficult.

Treatment of Large Hydronephroses.

G. MARION (*Journal d'Urologie*, July, 1939) reflects in the following conclusions regarding the problem of hydronephroses a modern change in attitude in regard to surgical treatment. This change is in the direction of conservatism, arising from the danger of deterioration of the opposite kidney following an already established dilatation, or one which may occur in the future. In the past there has been a more or less general tendency to remove the kidney as soon as a large hydronephrosis is diagnosed without further consideration of all possible aspects of the case. First of all it is indispensable to undertake a full functional and pyelographic study of the opposite kidney. Should any dilatation or functional insufficiency be present, the more affected kidney should not be removed on any account, but should be drained by permanent nephrostomy if more satisfactory treatment is not applicable. In regard to the large hydronephrosis itself, the ideal method of operation is as follows: (i) Any obstacle, such as an abnormal renal vessel, pelvic or ureteric calculus *et cetera*, which hinders the outflow of urine should be removed. (ii) Kinking of the ureter due to ptosis of the kidney is relieved by nephropexy. (iii) Splinting of the ureter by an indwelling ureteric catheter is carried out if necessary. (iv) Drainage of the kidney is established by a tube through the convex border, and is maintained in the loin so long as the pelvis and calyces tend to diminish in volume, as shown by pyelography. Such drainage may be kept up for some weeks, even a month or two.

Pelvic Lavage with Sulphanilamide.

G. AUSTEN, JUNIOR (*The Journal of Urology*, May, 1940), has undertaken experimental pelvic lavage with sulphanilamide. The object of this is to procure an adequate concentration of the drug in the renal passages in patients who, on account of intolerance, renal failure or deformity, cannot achieve this concentration when medication by the oral or subcutaneous route is used. The insolubility of sulphanilamide in water necessitated the production of a new combination—prontylin maltoside, or "P.S. 386"—which contains four times as much active sulphanilamide as a saturated aqueous solution. After animal experimentation had proved the procedure innocuous, this substance was used for pelvic lavage through indwelling catheters over periods varying from twelve hours to seven days. The drug so administered is well tolerated; bacteriological and clinical improvement was observed in eight out of ten cases, and in one other case infection was greatly diminished. Observations on the concentration of the drug in the blood, the urine from the injected kidney and the uninjected kidney demonstrate that absorption occurs in appreciable amounts from the renal pelvis and that it is also excreted from the uninjected kidney. The concentration obtained in the injected kidney is much higher than is obtainable by any other method of administration.

Prevention of Recurrence of Urinary Stone.

AFTER reviewing modern opinion as to the ætiology of recurrent urinary calculi, W. M. Kearns (*The Journal of Urology*, April, 1940) considers the following points of great importance: (i) administration of vitamin *A* in adequate dosage; (ii) water intake of sixty ounces daily; (iii) the addition of magnesium to the diet to increase the solubility of the urinary calcium content; (iv) in the hereditary conditions of cystinuria and xanthinuria, alkalinization of the urine and dietary limitation; (v) operative treatment of the parathyreoid glands in hyperparathyreoidism; (vi) the association of uric acid stones with gout, and in these circumstances the estimation of the uric acid content of the blood; (vii) limitation of intake of certain foods in oxaluria and the taking of steps to prevent intestinal bacterial putrefaction, especially lactic acid cultures, acriflavine and capiokol; (viii) the association of alkalinuria with gastric hyperchlorhydria and also with the excretion of those salts which are insoluble in an alkaline medium, and the consequent administration of hydrotropic substances, such as sodium benzoate with syrup glycocoll; (ix) the avoidance of long periods of recumbency, or, if essential, their minimization by change of position and movement; (x) the elimination of urea-splitting organisms, if present; (xi) topical applications of 1% to 5% lactic acid solutions.

Allergic Reaction in the Urinary Tract.

K. JAFFÉ (*Urologic and Cutaneous Review*, February, 1940) states that allergic reactions occur in the urinary tract with or without similar reactions in other organs. There are two varieties: (i) colic of the upper urinary tract and (ii) vascular reactions manifested by hæmaturia, œdema, purpura or even actual inflammation. Diagnosis is made by establishing the presence of eosinophilia or of eosinophilic leucocytes in the urine (findings which are unfortunately not constant), and by the therapeutic test—that is, a favourable response to adrenaline, ephedrine *et cetera*. Immediate relief is given by these measures, and they should be followed by elimination of specific allergy or by specific desensitization.

Special Articles on Psychiatry in General Practice.

(Contributed by request.)

XIX.

REASSURANCE BY SUGGESTION AND PERSUASION.

UNDERLYING all neuroses is a large element of fear or anxiety, which may be conscious, but which is often to some extent overlooked or forgotten, that is, repressed. This anxiety is due to conflict between emotional drives which the individual has been unable to adjust on the conscious level, but which has been met with only partial success by some psychological mechanism, for example, repression, dissociation, projection, rationalization, symbolization. The sign of this partial success is the development of the anxiety and neurosis, and it is for this that reassurance is sought by the patient.

In some cases of hysteria the underlying anxiety may not be apparent either to the patient or the physician. The patient shows a complete lack of anxiety, *"la belle indifférence"*, and it is only by a process of investigation that it can be inferred by the latter. In these cases it may seem foolish to talk of reassurance, but there is nevertheless an underlying anxiety regarding which the patient is reassured by his symptom. For example, there is no need for a decision between duty to an aged parent and desire for a handsome lover if a patient's disabilities, her anorexia and amenorrhœa or her paralysed limb obviously prevent all serious intention of marriage, and the symptom may be regarded as a reassurance against anxiety and guilt. In other cases, however, some anxiety is conscious; the patient may be fearful of anything: of making decisions, of crossing the road, of making friends or of losing them. At times this anxiety is centred on one particular situation as a phobia; but other patients show a "free floating fear" that fastens on anything or everything.

In this group reassurance seems definitely indicated and is often attempted, the patient being told that there is no need to worry about the situations that arouse the fear; but this attempt is made by everyone—friends, relatives, clergymen and doctors—only to be met with the statement: "I suppose it is true, but I can't help it."

In other cases the anxiety is associated with bodily symptoms, palpitation, constipation, flatulence and so forth, and attempts at reassurance have been made by practitioners, stating that there is "nothing organically wrong", there is only a "nervous heart", "gastric stomach", "spastic colon", or some other equally impressive diagnosis, accompanied by a *placebo* or bromide mixture.

If reassurance is to be of assistance, something more than this is required in the vast majority of cases. This is partially realized by many practitioners who know that the bottle of medicine may have a "suggestive" value, and that this suggestion is also of importance in impressive physiotherapeutic procedures, manipulations and operations, as well as in psychotherapy. This suggestion is active, even though little may be said, and seems to depend to some extent on the faith the practitioner has in his own pet procedure. Suggestion has been the subject of much discussion, and the phenomena which should be covered by this term vary with different authorities. Bernard Hart[1] has offered a definition, based on McDougall, of suggestion as a "process of communication whereby a proposition is communicated by one person to another and is accepted with conviction by the latter in the absence of logically adequate grounds for its acceptance, and owing to the fact that conflicting processes which are or should be present are inhibited", and this seems satisfactory.

It does not, however, attempt to explain how this acceptance of one belief and the inhibition of others take place, and if we are to make use of this process at all, the means to make it effective should be known. This undoubtedly depends on the affective relationship between the two persons, as is shown by the strength of a mother's suggestions to her child. Freud has claimed this affective relationship as an example of "transference" and states that in psychoanalysis "one's aim is by a very careful technique to prevent temporary successes arising through suggestion", that the aim of analysis is the dissolving of this transference, and that "if success then supervenes and is maintained it is not founded on suggestion, but on the overcoming of the inner resistances effected by the help of suggestion, on the inner changes achieved within the patient".[2]

In these sentences we see that the reality of the process is admitted quite frankly, though there is doubt as to the permanence of cure, and stress is laid on the importance of the inner resistances that have to be overcome "by the help of suggestion". Freud derives the strength of the transference from an underlying sexuality; but this may not be at all apparent. What is required is an atmosphere of trust and confidence, and this will be helped by a patient investigation of the patient's history and a thorough examination with a lack of criticism or even of advice in the early stages. The patient-physician relationship should always imply a respect for the prestige of the latter; but this should not require emphasis. An assumption of omniscience and omnipotence in the early stages is generally inadvisable.

If after this investigation it is felt that the removal of the patient's symptoms by suggestion is an immediate necessity, the full force of prestige, knowledge and power may have to be employed, for what is to be done is the implantation of a fresh belief in the patient's mind, together with the inhibition of the previous beliefs which have led to his symptoms. Instead of a belief that the arm cannot be used, or vomiting controlled, the contrary beliefs must be incorporated in the patient's mind, and this can be done at times with very dramatic results.

If the physician has prior to this gained some knowledge of the causative factors and can modify these, a permanent cure may result; but the defect in all frank suggestion is the liability to relapse. This applies both to suggestion in the waking state and to suggestion in the hypnotic state.

This liability is rather less if persuasion is used. Theoretically this persuasion should make use of reason and arguments to prove to the patient that his symptoms have no rational foundation, and it has been claimed that suggestion plays no part in the acceptance of these explanations and the resultant cures. This is probably untrue, and the two processes are generally associated. In the place of a belief arbitrarily imposed on the patient's mind by the force of suggestion alone, an attempt is made to incorporate a body of knowledge which supports this belief—for example, instead of a command to use a paralysed limb there is an explanation that the muscles are still quite sound, that the nerves are intact, that something in the behaviour of the limb proves this, and that some movements are possible, and so forth.

In anxiety states when the bodily aspects of fear have forced themselves into the patient's consciousness as palpitation, sweating, tremor, fatigue and so forth, the explanation may include the biological background of fear and perhaps an explanation of the mechanism by which these aspects of fear are conditioned to appear in certain situations. If the patient's history has been thoroughly investigated, and particularly if some of his conflicts have been laid bare, the explanation will be strengthened by an ability to show that the symptoms have developed at a time of emotional stress.

Although it may be possible to implant quite illogical unscientific beliefs in the minds of patients by suggestion, it is preferable to make these beliefs as rational as possible if permanence of cure is aimed at. For this reason the rough and ready methods of suggestion, with a bottle of medicine and a fanciful diagnosis of visceral neuroses, or faradism, hot air and manipulation for hysterical palsies or contractures should be avoided, and an attempt should be made to give the patient some insight into the psychological factors at work in causation. More preliminary work will be involved in so doing, but the diminished liability to relapse should more than compensate for this. Moreover, should the suggestion or persuasion based on physical agents fail, the task of further psychotherapy is rendered much more difficult than if a psychological approach has been made throughout.

Associated with the suggestion or persuasion, an attempt should be made to strengthen the new belief of cure by every possible means. This may mean a removal from harmful surroundings for a time to give the fresh beliefs a chance to sink in, or it may mean an attempt to build up the patient's interests, self-esteem and respect. This will always receive a severe blow with the curing of a symptom by suggestion—a self-defence has been removed and some other protection will be required. If this is not given by an easing up of strain, by environmental readjustment or by some reeducational process, there will be a great chance of a flight into an identical relapse or some other form of neurosis in the near future.

A neurosis must always be regarded as the end product of a long and complicated chain of causations, and while the symptomatology may be modified to a beneficial extent by suggestion, in many conditions, particularly in hysteria, one should not lose sight of the fact that the causative factors are still untouched. There are, therefore, several reasons why some psychological investigation is desirable in addition to suggestion or persuasion directed against the symptoms alone. There are, for example, a chance of a more satisfactory affective relationship to support the sug-

gestion, a better grasp of the difficulties with which the patient has been contending, with the possibilities of avoiding or minimizing these, the chance that the beliefs and anxieties responsible for the symptoms may themselves be amenable to suggestive amelioration, and a better chance of supporting the cure against future difficulties.

How far this investigation into causation should go must depend on circumstances. In some cases one feels that the patient's lack of sufficient intellect or of a sufficiently stabilized personality makes a detailed investigation impossible or impracticable, and the most that one can hope for is a removal of the symptoms by suggestion. In the majority of cases some investigation is possible, and whenever possible should be undertaken, though this investigation need not always go to the extent of an analysis of unconscious factors to provide a satisfactory basis for suggestion or persuasion.

As long as the medical profession retains the respect and confidence of the public there will always be a suggestive element in the way in which any statement by any member of the profession is received. Let us hope that the suggestive forces coming from us will always work towards a healthier and saner life, and that the respect and confidence will never be diminished, for it is in its therapeutic aspects of immeasurable value.

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References.

(1) Bernard Hart: "Psychopathology", page 132.
(2) Sigmund Freud: "Introductory Lectures of Psychoanalysis", page 378.

British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held on July 25, 1940, at the Royal Adelaide Hospital. The meeting took the form of a number of clinical demonstrations by members of the honorary staff of the hospital.

Ascites in an Infant.

DR. R. THOROLD GRANT showed a male baby, aged ten weeks, suffering from ascites. This had first been noticed when the child was six weeks old. The abdomen was aspirated and 30 ounces of clear yellowish fluid were obtained. The fluid was sterile and contained a few leucocytes. The specific gravity of the fluid was 1,016. The fluid gave no response to the Wassermann test. An X-ray film of the infant's long bones revealed no periosteal change suggestive of congenital syphilis. The mother submitted to a tuberculin test, which which also performed on the infant; no response was obtained in either instance. An X-ray film of the lung fields revealed no sign of lung disease. The heart shadow was more globular than normal; it suggested congenital disease. This latter suggestion was not supported by any clinical evidence. The cause of the peritoneal exudate was not at all obvious. Up to the time of the meeting three aspirations had been performed. The fluid did not reaccumulate so quickly as at first.

Splenic Anæmia.

The second patient shown by Dr. Grant was a girl, aged one year and ten months, suffering from splenic anæmia with an accompanying syndrome like cœliac disease. The child had been sent to hospital following an attack of hæmatemesis. An opinion was sought as to the advisability of performing splenectomy on so young a child.

Hydronephrosis Simulating Gall-Stones.

DR. IAN HAMILTON showed a married man, aged thirty-five years, who had been admitted to hospital on June 12, 1940. The night before he had experienced sudden severe pain under the right subcostal margin anteriorly; he said that it felt "like something in there trying to bore its way out". The pain shot around to the back under the right shoulder blade, doubled him up and made him roll around. This pain lasted for a night and a day and was relieved by morphine. He "dry retched" throughout the day on which he was admitted to hospital, and at the time of his admission he still had a "nag now and again under the ribs". He had had a similar attack about six years previously, but it had not been so severe. The only way he had been able to obtain relief from the present attack was by bringing up his right knee onto his abdomen. Apart from this he was quite well and had been so for a long time. He had an excellent appetite and "could eat like a horse".

On examination he was found to have a temperature of 100° F.; his pulse rate was 92 per minute and his respirations numbered 20 per minute. He was in no distress and there was a slight icteric tinge in his conjunctivæ. Slight muscle guarding was present in the right *rectus abdominis* muscle; Murphy's sign was present and Boas's sign was absent. Otherwise a complete examination revealed no abnormality.

He was treated as suffering from acute cholecystitis, and after eight days he was discharged to the out-patient department for investigation. A few days later he was seen at the out-patient department, where abdominal examination revealed no abnormality. A cholecystographic examination revealed no dye in the gall-bladder; this confirmed the diagnosis of cholecystitis.

He was readmitted to hospital for operation on July 4, 1940, and a laparotomy was performed on July 5, 1940. On the morning of the operation one of the student medical officers examined his abdomen and found a large mass in the right side of the hypochondrium, but did not report its presence to the surgeon at the time. The mass was again noticed by the surgeon before the operation was begun; but in view of the diagnosis a laparotomy was none the less performed. A cystic retroperitoneal mass, about eight inches in diameter, was discovered occupying the right loin. The liver and gall-bladder appeared normal; the right kidney was not palpable separately from the mass. A pyelographic examination was decided upon; this was made on July 18, 1940, and revealed gross hydronephrosis. The patient had had another attack of pain with pyrexia since then, and as this was settling down he was to undergo nephrectomy on July 26, 1940.

Dr. Hamilton said that the interest of the case lay in the history of two attacks exactly simulating gall-bladder colic, which, without abnormal appearances in the cholecystogram, gave every reason for the belief that the gall-bladder was diseased. Had the mass appeared sooner and had its characterestics been analysed, possibly its nature would have been recognized before the laparotomy was performed; but even then it was doubtful whether the diagnosis of cholecystitis and cholelithiasis would have been abandoned. The cause of the hydronephrosis was not obvious, but a kink could be seen in the ureter; presumably the lesion was due to adynamic pyelectasis and caliectasis, which were frequently seen. Fortunately the contralateral kidney was normal, so that at the worst the patient would be in a quite satisfactory state after nephrectomy. With regard to the question of treatment, Dr. Hamilton said that he could see no alternative to nephrectomy. The kidney was probably only a useless shell, as was indicated by its radiographic appearance and by the fact that a catheter specimen of urine from that side was insufficient in amount to test for urea concentration, whilst that from the left side gave a good normal concentration.

Volvulus of the Sigmoid Colon Inadvertently Treated by Drainage with Recovery.

Dr. Hamilton's second patient was a male, aged eighty-five years, who gave a history of pain across the lower portion of the abdomen of nine or ten days' duration; the abdomen had begun to swell. The pain had become worse, and the day before his admission to hospital it was very severe. His abdomen became much larger, and he vomited once on the day of his admission. He had not had a bowel action for seven or eight days, and he had belched up a lot of wind and passed some flatus. There was no disturbance of micturition. He had recently lost two stone in weight and had had a poor appetite. The only previous illness of note was bronchitis five years previously.

Examination revealed a distressed aged man with a very much distended abdomen tympanitic to percussion; occasional peristalsis was visible. An enema produced no result; the fluid was returned almost immediately, just coloured, without force or flatus. A diagnosis of intestinal obstruction was made, and in view of the patient's extremely poor condition it was decided to perform a blind caecostomy with a local anæsthetic. The incision was made obliquely over McBurney's point. A loop of enormously distended large bowel, extremely tense, was delivered as well as possible. It was taken to be the caecum and a Paul's tube was tied in. Much gas escaped and the abdominal distension went down quite surprisingly. The patient gradually recovered; the material from the bowel drained slowly at first through the Paul's tube, later through the fistula.

An X-ray examination made later revealed that the loop of bowel drained was the middle of the sigmoid colon, which

had apparently undergone volvulus, thus causing the obstruction which had been relieved by the drainage. No other obstruction could be found. Dr. Hamilton said that the case illustrated what must be unique—that a volvulus could be relieved by drainage of the loop; it also showed the danger of blindly draining the colon in intestinal obstruction. Blind caecostomy was very rarely to be advocated; but in such a case as this, in which an aged patient was almost moribund and had an enormously distended abdomen, it was sometimes a life-saving measure, but apt to lead the surgeon into many pitfalls.

DR. A. BRITTEN JONES asked whether no *appendices epiploicæ* were seen.

Dr. Hamilton, in reply, said that these were not seen on the loop of bowel, which was so extremely distended and tense that only a portion of the wall was drawn through the small incision. The presence of a longitudinal band was taken to indicate that this gut, lying in the position and direction of the caecum, was probably caecum.

Tuberculous Teno-Synovitis or Compound Palmar Ganglion.

Dr. Hamilton finally showed a male patient, aged fifty-four years, who was receiving an invalid pension, as he suffered from pulmonary tuberculosis. The patient complained that for eighteen months his left wrist had been swollen, painful at times, but not extremely so; his left little finger had also been swollen. He had been unable to close the fingers properly, he had had some lumps in the arm and sometimes his hand had felt dead and numb.

On examination a fluctuant swelling was found above the wrist with a creaking feeling suggesting melon-seed bodies. This swelling extended under the anterior carpal ligament into the palm, filling the ulnar side of the palm of the hand, with fluctuations from above to below the wrist. The little finger was also very swollen, but not tender. There was poor movement in the middle ring and little fingers. The main interest centred on the question of treatment. It seemed that the condition would not resolve by conservative methods.

DR. L. O. BETTS suggested that movement would be improved if the bursa was opened and the melon-seed bodies were removed by irrigation.

DR. N. M. GUNNING suggested that the entire bursa should be dissected out.

SIR HENRY NEWLAND agreed with Dr. Gunning's opinion.

There was a general consensus of opinion that in this case movement would be little improved.

Dr. Hamilton, in reply, said that he favoured conservative treatment for the time being, on the grounds that the patient was sustaining little, if any, harm from keeping the bursa, and that probably function would be further impaired by extensive dissection. The suggestion to wash out the bursa was worthy of careful consideration and would be borne in mind, as would the other suggestions.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, Melbourne, on May 8, 1940, DR. H. DOUGLAS STEPHENS, the President, in the chair.

Cretinism.

DR. H. J. SINN showed three patients with cretinism, to draw the attention of the members of the society to the unusual epiphyseal changes sometimes encountered, to recall the delay in ossification, and to emphasize the importance of early and continued supervision and treatment in cretinism.

The first patient was a male, aged fifteen years, who weighed 68 pounds and was only three feet eleven inches in height. He had not walked till the age of six years and had not attended school. His speech was defective, being limited to inaccurately pronounced monosyllables. Medical advice had been sought by the mother when the child was two years of age, but was not carried out. Again, when he was seven years of age, a medical opinion had been obtained, and for two years thyreoid tablets had been administered regularly with benefit. Another long lapse from treatment had followed until the child had, at Saint Vincent's Hospital, come under the notice of Dr. Thomas King towards the end of 1939, because of dwarfism and backwardness. Dr. Thomas King had referred the patient to a physician, and Dr. Sinn had investigated his condition and treated him for four months. Characteristic features of cretinism were observed, and Dr. Sinn referred more particularly to the radiological investigations. From the skiagrams of the head it was deduced that the pituitary fossa was enlarged and the chiasmatic sulcus was unduly prominent, and that thickening of the anterior fossa and the floor of the middle fossa had occurred. It was seen in the skiagrams of the wrists that there was retardation of osseous growth; the centre of ossification for the pisiform was absent. The pelvis was normal radiologically. Dr. Sinn said that he had commenced treatment with thyreoid gland tablets by prescribing one grain three times a day, and that that amount had been doubled since; the boy was also taking 60 grains of calcium lactate and three drachms of sweetened carbonate of iron daily. He had lost two and a half pounds in weight and gained two inches in height while under treatment. Dr. Sinn regarded it as significant that the mother had commented that whereas the boy used to be cold he was always warm nowadays.

The next patient shown by Dr. Sinn was a female, aged twelve years and six months, who had been referred to him at the Children's Hospital by Dr. E. E. Price four months previously because of her small stature. She had always been small, but medical advice had not been sought till, at the age of ten years, she was given thyreoid therapy for about three months only; although her condition had begun to improve, her parents discontinued treatment on account of the expense incurred. She had attained the standard of Grade V at school and was not regarded as defective mentally, at all events for her size. Her height was three feet nine and a half inches only, and her weight 52 pounds. In a general way the physical appearances of the child were those of subthyreoidism rather than of cretinism. Dr. Sinn directed special attention to the skiagrams, and showed from them that the pituitary fossa was not obviously enlarged, but that delayed ossification was present; the pisiform centres and the lower ulnar centres were missing. The skiagrams of the hips were of particular interest because of the fragmented ossification in the upper epiphyses of the femora and great trochanters; the appearances resembled those of Perthes's disease, from which they had been distinguished. While under treatment for three months the child had been taking each day one and a half grains of thyreoid extract and three tablets of di-calcium phosphate with 15 minims of "Adexolin". Her weight had remained stationary, but her height had increased by two and a quarter inches in three months.

Dr. Sinn also showed a girl, aged fifteen years and six months, who had been undergoing treatment for three and a half years by Dr. E. L. Cooper, to whom Dr. Sinn was indebted for the opportunity to show the patient. She had not walked till the age of three and a half years or talked till almost six years of age. She had always been small and had never been to school. The second dentition had been delayed till the age of eleven years. According to Dr. Cooper's notes, at the age of twelve years the child's height was forty inches and her weight only forty and a quarter pounds. The clinical appearances of cretinism were pronounced. Dr. Sinn showed from the skiagrams that there were epiphyseal changes affecting the heads of the femora and also the great trochanters associated with blurring of the outline of the acetabula. He also demonstrated delayed ossification of the carpus, only five bones of which could be visualized, and fragmentation of the epiphyses of the metacarpals and ulnar bones. Treatment by means of thyreoid extract had been commenced with one grain a day, and the amount had gradually been increased to four grains a day. In fourteen months the patient had gained five and three-quarter inches in height and nine and three-quarter pounds in weight, and it was seen in skiagrams that osseous regeneration had taken place, particularly in the femoral heads and trochanters.

Dr. Sinn said that he had discovered that some 2,468 articles had been written on cretinism, and Dr. Gabriel had given an excellent synopsis of important features of the history of cretinism at the meeting of the Melbourne Pædiatric Society held on July 13, 1938; this had been published in THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, 1938, at page 837. Therefore Dr. Sinn did not propose to cover the same ground; but he would refer briefly to the literature of cretinoid epiphyseal dysgenesis, concerning which he had been unable to find anything in the British or Australian journals. In 1897 Langham, writing in German, had described the appearances of curious stippling of the epiphyses in true cretinism, and the work was done on cadavers. In 1927 Fairbank (*The British Journal of Surgery*, Volume XV, 1927, page 120) had reported instances of dwarfism with stippled epiphyses, but had not recognized any thyreoid disturbance. In 1928 Leeman and Looser had

published independently in the German literature descriptions of the clinical, pathological and radiological aspects of the condition. In 1937 W. A. Reilly and F. S. Smyth (*Journal of Pediatrics*, Volume II, 1937, page 786) had published an article entitled "Cretinoid Epiphyseal Dysgenesis"; they referred to the formation of epiphyses from multiple centres of ossification, especially in the hip joint; they commented that the dysgenesis was characteristic of true endemic rather than sporadic cretinism; and they had noted changes other than those in the femora at either end of the humerus, ulna, radius, tibia and fibula and in the vertebral column. Dr. Sinn went on to say that Reilly and Smyth considered that there was no doubt that the epiphyseal dysgenesis accounted for severe forms of deforming arthritis and destruction of the head of the femur in adult cretinism; they had also held that with thyreoid therapy and without immobilization normal development of epiphyses might become apparent within one year. He added that they advocated relatively low dosage of thyreoid preparations with the object of preventing early union of epiphyses and metaphyses, combined with the administration of fat-soluble vitamins and an effective preparation of calcium.

Dr. Sinn then directed attention to an article published in 1930 by P. Macarthur (*Archives of Disease in Childhood*, Volume XI, 1930, page 243), entitled "The Ossification of the Carpus in Rickets, Congenital Syphilis and Cretinism"; in the series delayed ossification occurred in only one-quarter of the cases of rickets and in fifteen out of sixteen cases of cretinism. Dr. Sinn also referred briefly to the variation in mental development in cretinism, to the importance of noting the effect of the changes in thyreoid dosage published in the 1932 edition of the British Pharmacopœia, the importance of accurate dosage and avoidance of over-dosage and a number of other interesting features of the subject.

DR. COLIN MACDONALD showed a male dwarf, aged twenty-two years, and only forty-two and a half inches in height. The patient was a Scotsman of Irish parentage and had spent his early years in Glasgow. His mother had died while he was an infant, and as his father was a deep-water sailor, he had been deprived of parental care. As far as could be gathered, the patient had received some treatment in Glasgow before coming to Australia, but later it was known definitely that he had had no thyreoid treatment for eleven years. Dr. Macdonald showed in skiagrams of the patient the radiological features of untreated sporadic cretinism and the rapidly favourable response even to late medication with thyreoid extract. He said that when at the Women's Hospital in 1939 he showed a series of dwarfed women, he had remarked that, with certain exceptions, dwarfism had become rare, probably owing to advances in endocrinology. Dwarfs usually belonged to the group characterized by osteochondral dystrophies, such as achondroplasia and Morquio's disease. Those comments had prompted Dr. Lear, of Preston, to tell Dr. Macdonald about the patient he was showing that night. He had carried out a complete radiological investigation at the Children's Hospital at that time, and he showed those films and a new set taken recently, together with clinical photographs. During the twelve months the patient had grown seven inches in height and had gained approximately one stone in weight. Before thyreoid administration he had had to be wheeled round in a chair, but he had become able to run; his mentality had improved greatly, the permanent teeth were erupting and the supraclavicular pads of fat were no longer prominent features. Dr. Macdonald said that under Dr. Lear's supervision the patient had had continuous thyreoid therapy for fifteen months, the daily dosage having been increased gradually from one and a half grains to six grains given in tablet form. The dosage was reduced later to three grains daily, because libido was manifested and became a source of worry to the foster mother.

Dr. Macdonald showed that there were evidences in the earlier films of the poor calcium content of the bones generally, of delay in the appearance of ossific nuclei, particularly in the carpus, and of persistence of wide epiphyseal lines. The disparity between the "chronological" age and the "bone" age was strikingly illustrated. He commented that at that stage the films, particularly those of the hips, were not unlike those showing the "woolly" type of renal rickets. There were no evidences of epiphyseal dysgenesis or of multiple ossific foci for the femoral head, as in the case of the second patient shown by Dr. Sinn; that might be due to the fact that his patient was ten years older and that the multiple ossific foci had fused.

Dr. Macdonald then discussed the radiological features differentiating cretinism from other generalized diseases of bone, and remarked on the infrequency with which references to cretinism were found in radiological literature. In conclusion, he expressed warm thanks to Dr. Sinn, not only for showing his three patients, but also for so thoroughly reviewing the whole subject.

Cerebral Tumour sans Tumour.

DR. MOSTYN POWELL showed the girl shown by him at the meeting of the society held on October 11, 1939, an outline of whose case had been published in THE MEDICAL JOURNAL OF AUSTRALIA on April 13, 1940, at page 526. Dr. Powell said that the patient had continued to be free from symptoms; hirsutism had developed during convalescence, affecting the abdomen, forearms and face, but it had disappeared. At the operation the intercerebral hydrostatics must have been altered in some way, perhaps through the breaking down of adhesions. Dr. Powell added that no abnormal appearances were discernible on examination of the *fundi oculorum*.

DR. J. G. WHITAKER, who had operated on the patient shown by Dr. Powell, commented that he was astonished by the efficacy of partial cerebellectomy. The patient could have only a small portion of cerebellum left, and her case illustrated how it was possible to get along quite well without what was generally considered to be an essential organ.

DR. COLIN MACDONALD drew attention to the fallacy arising out of a consideration of the case; had she received radiation therapy, for example, the treatment would have appeared to be associated with a remarkable cure, and the result might have been claimed as an effect of the treatment.

Cerebral Tumour.

Dr. Powell also showed a girl, aged four and a half years, who was at the time an in-patient at the hospital, in the care of Dr. Grieve. Dr. Powell had been invited to examine her and to express an opinion concerning the diagnosis and appropriate treatment. Some three months earlier her left eye had turned inwards, and soon afterwards weakness in the right leg was apparent, followed at intervals by weakness of the left leg, left arm and right arm, in that order. On her admission to hospital two weeks before the meeting spastic quadriplegia was present and headache and vomiting had occurred. Dr. Powell drew attention to the presence of affection of the sixth and seventh cranial nerves, particularly on the left side, and of nystagmus of the right eye when the patient looked to the right; he said that the appearances of the *fundi oculorum* were to all intents and purposes normal. The corneal reflexes had gone and the right eye was anæsthetic; there was no definite discrimination of pin-prick on one side of the face, in contrast with the other side. The tongue deviated strongly to the right and the palate was immobile. On each side the Babinski reaction was readily obtainable. Summing up, Dr. Powell observed that the signs were those of brain-stem and pontine involvement, with very light incidence on the sensory tracts and very little evidence of increased intracerebral pressure. He had made the diagnosis of the presence of a gross neoplasm of the pons with characteristic escape of the sensory fillet; it was an infiltrating rather than a pressure-producing lesion. As it was obviously basal and obviously invading all the cranial nerves, he thought that attempted operative removal was contraindicated, though perhaps it would be worth while submitting the patient to deep X-ray therapy.

Osteochondral Dystrophy.

DR. J. G. WHITAKER showed a boy, aged seven years, suffering from osteochondral dystrophy. Overgrowth of the radius had taken place, associated with cessation of growth of the ulna; the upper end of the radius was not articulating with the humerus, but was sticking out as a projection. The boy had many other chondral lumps on the tibiæ, ulnæ and elsewhere. Dr. Whitaker said that several members of the family, including the patient's cousins, had similar peculiarities, and one of the cousins had come under his care in 1932 because of arrest of ossification of the ulna and continued growth of the radius. He added that in the present case he proposed to remove the upper excrescence and to destroy the lower epiphysis in order to arrest the growth of the radius.

DR. COLIN MACDONALD expressed his interest in the case, which he accepted as an example of Keith's diaphyseal aclasis in contradistinction to Ollier's disease, which he called dyschondroplasia. Ollier had described a condition which led to a lack of symmetry of the body evidenced by the presence of an enchondroma and a limp in one leg; the enchondroma had no lamellar structure. On the other hand, in Keith's condition the lamellæ were widely spaced and there was no destruction. Dr. Macdonald drew attention to the ossific structure shown in the skiagrams of the patient shown by Dr. Whitaker, and said that it was of great radiological interest; he had seen many examples of hereditary deforming dyschondroplasia with deformities of axial ends of long bones and sessile chondromata, but he had not seen that ossific structure before. He remarked that Ollier was a Frenchman and Keith a Scot, and emphasized the point he had made by asserting that there was as much

distinction in the diseases they had described as there was in their nationality, and that in addition there were many examples of chondrodysplasia which should not be associated with the name of either.

DR. H. DOUGLAS STEPHENS recalled that many years earlier he had shown before the society a girl who had multiple enchondromata associated with vascular features including vascular tumours and papillomata. He had also shown a characteristic example of Ollier's disease, which was almost always localized to the lower part of the femur and to the pelvis on one side, with shortening and limp.

Double Uterus.

DR. W. R. FORSTER showed a girl, aged twelve years, from whom he had removed a specimen which consisted of a uterus and vagina forming part of a double uterus; he also showed the biopsy specimen. Dr. Forster said that early in 1940 he had operated on the child and removed a parotid tumour; it was quite superficial and had come away readily from under a capsule. The child was admitted to hospital under his care in the middle of April on account of abdominal pain, and it was found that her mother knew that she had had a palpable mass in the lower part of the abdomen for several months. The mass, palpated through the abdominal wall, seemed to be the size of a coconut; the patient was a little jaundiced and some abdominal rigidity was noted. A large tumour pressed on the rectum, and on vaginal examination under general anæsthesia Dr. Forster had been able to feel a cervix attached to a small uterus pushed over to the left and also a large mass on the right. Dr. Forster added that the patient had not menstruated, but had had attacks of abdominal pain at an interval of three weeks. At the time he thought the mass was an ovarian cyst or an endometrioma with torsion or rupture or some other crisis, and he was not able to exclude the possibility of appendiceal abscess. In describing the operation, he said that when the abdomen was opened free brownish fluid escaped as from a ruptured endometrioma. He had tried to remove the large tumour extraperitoneally, and after it was out had discovered that he had performed a hysterectomy and vaginectomy. The uterus and vagina removed had not communicated with the other vaginal opening; he had left *in situ* a small uterus with one tube. The tumour he removed was very vascular, and he had found that the right uterine artery ran into it. On reflection he realized that it might have been better to establish a communication with the other vagina that had an outlet; but he assured the members that he had left another uterus and vagina in the patient's pelvis. He also stated that she had menstruated into the uterus which he removed.

DR. G. RALEIGH WEIGALL said that when he was a resident medical officer at the Children's Hospital he remembered seeing a girl, aged twelve years, who had menstruated normally through one half of a double uterus, and it had been noted that the tumour became larger with each successive menstrual period. He went on to say that at the operation it was found that a tumour similar in size to a five months' pregnancy had been removed. He also recalled that he had dubbed the condition "hemihæmatohysteros" and that Dr. Reginald Webster had insisted on using the term "hæmatohemihysteros" instead. Dr. Weigall also recounted some of the details of the case of a woman he had anæsthetized in 1939 for the operation of Cæsarean section; half a uterus had been removed earlier, and to terminate pregnancy he thought that that operation was indicated: the scar and puckering that had resulted could be seen and the portion that remained was quite infantile.

DR. A. GWYNNE VILLIERS said that Dr. Leslie Kidd, when carrying out an investigation on the subject of sterility, had made a histographic examination on one of the subjects and found blocked tubes; but the woman had had two miscarriages and two normal pregnancies.

DR. H. DOUGLAS STEPHENS wondered whether the condition should be regarded as an example of bicornuate uterus, of which one side was blind in respect to the other and to the vagina.

DR. C. KELVIN CHURCHES expressed the opinion that the case was extremely rare, in that there was a complete double vagina as well as a double uterus.

Dr. Forster, in reply, said that in the present case two cervices and two vaginæ existed; one of the vaginæ did not communicate and there were one tube and one ovary to each side. He could not understand why the patient had not menstruated on the side that he had not removed.

Osteochondritis Dissecans.

Dr. Forster also showed a boy, aged eight years, who had come under his notice on account of limp and flexion deformity with limitation of normal movements at the knee joint. The joint was swollen and the corresponding inguinal glands were enlarged. Dr. Forster said that the condition had persisted for many weeks and at first the appearances in the skiagrams were not abnormal. The Mantoux test produced a strongly positive reaction, and an aunt had died of pulmonary tuberculosis and the mother had been under suspicion of tuberculosis, though ultimately the condition was regarded as non-tuberculous. Dr. Forster went on to say that the child was admitted to the Frankston Orthopædic Branch of the Children's Hospital, and it was considered that he had a tuberculous knee joint. A biopsy of the inguinal gland, however, had been carried out by Dr. Reginald Webster, who had reported that he had found no evidence of tuberculous disease in the microscopic preparations. Blood sedimentation tests had been performed at intervals and the rate had become low, whether the boy was at rest or ambulatory. In the circumstances Dr. Forster had revised the diagnosis, and in more recent skiagrams a small area of deficiency characteristic of *osteochondritis dissecans* was detectable and a small bony foreign body could be visualized in the joint. He thought it would be of interest to members to see an example of the condition in so young a subject; it appeared more usually between the ages of fifteen and twenty-five years.

DR. COLIN MACDONALD pointed out that the term *"dissecans"* connoted that the osteochondritis was of the dissecting type, and bore no relationship to the somewhat similar word *"desiccans"*, which referred to "drying". He said that it was Ambroise Paré who had drawn attention in the early sixteenth century to the loose body in the joint, and Paget, believing the condition to be aseptic, had called it "quiet necrosis". Dr. Macdonald went on to say that Kernig had written extensively on the subject. The discussion had raged around whether the "joint mouse" burrowed the hole or was born in it. He believed that the mouse was born away from the hole; the little fragment might be attached and was not necessarily loose. Dr. Edgar King had held that the loose bodies were due to budding from the synovial fringe, followed by metaplasis to cartilage and later to bone: the loose body tended to find the position in the joint where best it could rest, and there it dug its hole. Dr. Macdonald said that he had seen about thirty cases, and he thought that the patients were usually aged between ten and fourteen years. It was not exceptional, after removal of the loose body, for another body to appear in exactly the same spot in subsequent skiagrams.

DR. H. DOUGLAS STEPHENS said that on the day preceding the meeting he had reexamined a boy, aged eleven years, upon whom he had operated two years earlier, removing under local anæsthesia a loose body about the size of a shilling. He had used local anæsthesia to avail himself of the cooperation of the patient in localizing the position of the loose body in the joint; it was freely movable, and the boy could make it present more or less at will at quite a number of positions under the joint capsule. In that case the formation of the loose body was attributed to subchondral fracture as a traumatism. The boy had come to see him on the previous day, in the belief that he again had a loose body in the joint.

DR. J. G. WHITAKER said that he remembered showing two patients at the same meeting, one with bilateral and the other with unilateral *osteochondritis dissecans*. He said that in one instance there was merely a hole in the femoral condyle and no "mouse" was found; at operation he had located the hole and scraped it, and two years afterwards he had ascertained that the patient had had no further trouble. In the other case Dr. Whitaker recalled that the "hole" was subchondral and the cartilage was not broken.

Exenteration for Osteomyelitis.

DR. W. KENT HUGHES showed a man, aged twenty-five years, upon whom he had operated twenty years earlier for osteomyelitis. He said that he had exenterated the shaft of the tibia, which had regrown; the man was able to play football, lump wheat, ride horses and carry out all the usual functions of the limb satisfactorily. He added that the man was an employee of the Tramways Board and had no disability. He affirmed that exenteration of the shaft was the best treatment for chronic osteomyelitis of a long bone. He had been led to adopt it by Leriche's method of dealing with comminuted fractures; all the bone fragments were picked out, only the periosteum being left, from which new bone was formed. He believed that it was an Aberdeen man who had introduced the procedure for osteomyelitis, and that he was so satisfied with it that he still used it. Dr. Kent Hughes expressed himself as convinced that, in osteomyelitis of more than three months' duration, to get a good result it was imperative to exenterate the bone; it might be possible nowadays to use chemotherapy as well.

DR. H. DOUGLAS STEPHENS said that in the past he had become used to seeing osteomyelitis affecting the whole of the tibia. He had been tempted to pick the whole shaft out, but he had satisfied himself that if that were done early

the tibia did not develop, except for a triangular portion at either end; the children had to walk with artificial limbs. He remarked that the periosteum took six weeks or a little more to form a scaffold which would lead to the regeneration of the shaft, and mentioned that he had long ago adopted the practice in such a case of removing the sequestrated shaft.

Medical Practice.

THE PRESCRIPTION OF DRUGS AND WAR-TIME ECONOMY.

AT the request of Sir Alan Newton, Chairman of the Medical Equipment Control Committee, we publish the following "prescribing suggestions", based on drugs wholly manufactured in Australia, that have been drawn up for the committee by Dr. Byron L. Stanton.

There is a general impression that a very large number of drugs is produced in Australia, and, within limits, this is true. When, however, we look into the matter more carefully, it is found that many of the manufactured drugs are made from imported raw products; while many that are alleged to be local products are in fact imports that are merely put into their ultimate packings in this country.

It is true that many of the raw products are found in this continent—for example, mercury ores—but hitherto it has not been a paying proposition to convert raw materials into chemically pure drugs. This will, without doubt, correct itself with perhaps some stimulating direction from the Medical Equipment Control Committee, as restrictions of imports and increased demands pave the way for potential dividends.

Among plant products, it is well known that many of unchallengeable therapeutic value will grow readily in the diverse conditions of climate and soil of our continent. The writer has grown, among many others, opium, belladonna, digitalis, colchicum and senna. However, because of the cost of production and harvesting, and the uncertainty of local markets, there has been little stimulus to study the cultural conditions favouring the maximum production of active principles; where chemical or biological assays have been made, they have lacked system and coordination. A place of cultivation, however, has now been taken up by the Council for Scientific and Industrial Research with voluntary assistance from scientific workers in various States, and a recent report from Mr. H. Finnemore, of Sydney University, indicates that the local production of galenicals of atropine and hyoscine from the *Duboisia* species is well within sight.

The position with regard to the production of fine chemicals—for example, arsphenamines, sulphonamides, cocaine substitutes, dyes, synthetic hormones and vitamins *et cetera*—is still less satisfactory, for, though many of these can be and have been produced in individual laboratories, it is a long step from the laboratory to the commercial enterprise.

From these observations it will be noted that the list of drugs wholly manufactured from Australian products is small, and, *per se*, insufficient to satisfy the needs of modern therapy.

Therapeutic gaps will be filled as a result of the activities of the Medical Equipment Control Committee; but from the meagre Australian *materia medica* a few sample prescriptions are submitted.

It is not in any way suggested that therapeutic efficiency should be sacrificed in our desire to use purely Australian drugs—that would indeed be a short-sighted policy—but rather that our stocks and future imports of non-Australian drugs should be used thoughtfully and economically in response to some definite and specific therapeutic need.

Antacids.

Adsorbents.

(i) Bismuth Carbonate .. .. 20 gr.
Sod. Bicarb. .. .. 20 gr.
Heavy Magnesium Carb. .. .. .. 20 gr.
Peppermint Oil .. .. ½ minim

(ii) Bismuth Carbonate .. .. 15 gr.
Sod. Bicarb. .. .. 15 gr.
Heavy Magnesium Carb. .. .. .. 15 gr.
Kaolin .. .. 15 gr.
Peppermint Oil .. .. ½ minim

(iii) Bismuth Carbonate .. .. 20 gr.
Calcium Carbonate .. .. 20 gr.
Kaolin .. .. 20 gr.
Peppermint Oil .. .. ½ minim
(Astringent and adsorbent.)

(iv) Colloidal Kaolin. Dose: ½ to 2 oz.
(Dysentery, chronic diarrhœa, food poisoning.)

(v) Magnes. Trisilicate. Dose: 15-60 gr.

(vi) Liquor Bismuth. et Ammon. Citrat. (A.P.F.) Dose: ½-1 drachm. (1 drachm = 5 gr. Bi.)

Adsorbents for External Application (Dusting Powders).

Bases: Starch; Kaolin, Precipitated chalk; French chalk; Zinc oxide; Zinc stearate. Bases used singly or in combination, and oils of eucalyptus, or lavender, or menthol (1-10 solution in alcohol) may be used with them.

E.g.

Zinc Stearate .. .. ½ oz.
Starch ad .. .. 2 oz.
Oil of Eucalyptus .. .. 10 minims

Kaolin Poultice
(Cataplasma Kaolini)—
"Plastine" type.

Zinc Oxide .. .. 1 oz.
Kaolin .. .. 1 oz.
Starch .. .. 1 oz.

Antiseptics.

Bases: Alcohol; Cresylic Acid; Carbolic Acid; Calcium or Sodium hypochlorite; Eucalyptus oil; organic silver compounds.

(i) Liquor Cresol Saponatus

(ii) Liquor Sodæ Chlorinatæ
(Dakin's solution)

(iii) Liquor Eucalypti Saponatus (A.P.F.)
Eucalyptus Oil .. .. 6 fl. oz.
Soft Soap .. .. 132 gr.
Cresol .. .. 60 minims
Distilled water to .. .. 8 fl. oz.

(iv) Eucalyptol .. .. 6 fl. oz.
Alcoholic Soap to .. .. 1 pint
2 drachms to a pint of water as soluble antiseptic lotion

(v) Argento-Proteinum mite
(Argyrol type)
5-20% solution for conjunctiva, nose, ears, etc.

or

Argento protein mite 10%
Distilled water q.s. to dissolve
Glycerin to 2 oz.
(Paint for gingivitis, buccal ulcers, tonsillitis *et cetera*)

Diuretics.

A. Alkaline.

Bases: Sod. Bicarb.; Sod. Carb.; Sod. Citrate.

Prescribe as crystals; in simple solutions or as effervescing draughts:

60 grains Sod. Bicarb. neutralizes 51 grains of Citric Acid or about 1½ fl. oz. lemon juice.
60 grains crystalline Sod. Carb. neutralizes 30 grains Citric Acid or about 1 fl. oz. lemon juice.

B. Acid.

Bases: Ammonium Chloride, Calcium Chloride.

E.g.

Ammonium Chloride .. .. 20 gr.
Ext. of Glycyrrhiza .. .. 10 m.
Syrup of Orange .. .. 40 m.
Water to 2 drachms

C. Antiseptic and Sedative.

Ol. Santali Australiensis in capsule, emulsion or solution.

Expectorants.

(i) Ammonium Carbonate .. .. 5 gr.
Liq. Ext. of Glycyrrhiza .. .. .. 10 m.
Spirit of Peppermint .. .. 5 m.
Water to .. .. 2 drachms

(ii) Ammonium Chloride .. .. 10 gr.
Liq. Ext. of Glycyrrhiza .. .. .. 10 m.
Syrup of Orange .. .. 30 m.
Peppermint water to .. .. 2 drachms

Iron Preparations.

Bases: Ferrous sulphate; Iron and ammonium citrate; Saccharated carbonate of iron; Ferrous Chloride.

(i) Pil Ferri (Blaud)
(15 gr. after meals)

(ii) Ferri Carb. Sacch.
(60 gr. after meals)

(iii) Iron and Ammonium Citrate .. .. 20 gr.
Syrup of Orange .. .. 40 m.
Water to .. .. 2 drachms
(iv) Ferrous Sulphate .. .. 2 gr.
Copper Sulphate .. .. 1/25th gr.
Magnes. Sulphate .. .. 20 gr.
Syrup of Glucose .. .. 1 drachm
Peppermint Water to .. .. 2 drachms
(v) Syrup of Ferrous Chloride (A.P.F.)
1 drachm = 3 gr. Ferrous Chloride

Arsenic may be added to these if desired—*e.g.*:

Pil Ferri .. .. 10 gr.
Arsenious Acid .. .. 1/30th gr.
Iron and Ammon. Cit. .. .. 20 gr.
Liquor Arsenicalis .. .. 5 m.
Syrup of Orange .. .. 40 m.
Water to .. .. 2 drachms

Inhalations.

(i) For use on handkerchief or on "Burney Yeo" Mask:
Menthol .. .. 60 gr.
Cineole .. .. 180 m.
Oil of Lavender .. .. 60 m.
Rectified Spirit to .. .. 1 fl. oz.
or
Menthol .. .. 60 gr.
Cineole .. .. 180 m.
Creosote .. .. 180 m.
Rectified Spirit to .. .. 1 fl. oz.
(ii) For vaporization with steam:
Menthol .. .. 15 gr.
Eucalyptus Oil .. .. 60 m.
Creosote .. .. 30 m.
Light Carbonate of Magnesia .. .. 80 gr.
Water to .. .. 1 fl. oz.
½ teaspoonful to a pint of boiling water.
(iii) Menthol .. .. 4 gr.
Cineole .. .. 10 m.
Almond Oil to .. .. 1 fl. oz.
For direct application to nose, or for use with nebulizer.

Liniments.

(i) Lin. Saponis (B.P.)
(ii) Lin. Eucalyptus
Soft Soap .. .. 75 gm.
Eucalyptus Oil .. .. 650 mils
Water to .. .. 1,000 mils
(iii) Strong solution of Ammonia .. .. 120 m.
Eucalyptus Oil .. .. 120 m.
Cotton Seed Oil to .. .. 2 fl. oz.

Laxatives.

Magnes. Sulphate. Sodium Sulphate.

"Tonics."

(i) Simple Alkaline Bitter—
Bicarbonate of Soda .. .. 15 gr.
Liq. Ext. of Glycyrrhiza .. .. .. 5 m.
Infusion of Orange to .. .. 240 m.
(ii) Simple Acid Bitter—
Dilute Hydrochloric Acid .. .. .. 10 m.
Syrup of Lemon .. .. 60 m.
Infuse of Orange to .. .. 240 m.
(iii) Malt and Iron—
Iron and Ammonium Citrate .. .. 60 gr.
Distilled water q.s. to dissolve
Extract of Malt to .. .. 4 oz.
1-4 drachms for a dose
or
Iron and Ammonium Citrate .. .. 6 gr.
Liq. Ext. of Malt to .. .. 120 m.
(iv) Malt and Liver—
Liq. Ext. of Liver (B.P.) .. .. .. 60 m.
Tincture of Orange .. .. 10 m.
Liquid Ext. of Malt to .. .. 120 m.
2 drachms for a dose

Ointments and Creams.

(i) Simple Emollient Creams—
Anhydrous wool fat, Glycerin, Lard, Water } equal parts
or
Whitewax .. .. 120 gr.
Lard .. .. 180 gr.
Olive Oil .. .. 1 fl. oz.
Borax .. .. 10 gr.
Distilled water .. .. 240 m.

(ii) Zinc Ointments—
(made with lard base)
Tar, 10 to 60 gr. to the ounce
Eucalyptus, 30-60 m. to the ounce
Menthol 10-60 gr. to the ounce
may be added
Zinc Oleate Ointment
Zinc Cream—
Zinc Oxide .. .. ½ oz.
Maize Oil .. .. ½ oz.
Lime Water .. .. ½ oz.
Wool Fat .. .. 60 gr.
(iii) Calamine Preparations—
(*a*) Calamine Lotion (A.P.F.)—
Prepared Calamine
Zinc Oxide
Glycerin of each .. .. ½ oz.
Lime Water .. .. 2 fl. oz.
Water to .. .. 8 fl. oz.
(*b*) Calamine Cream—
Calamine .. .. 60 gr.
Zinc Oxide .. .. 60 gr.
(Phenol .. .. 8 gr.)
Olive Oil .. .. 1 fl. oz.
Lime Water to .. .. 2 fl. oz.

Note: Ointment bases include lard, suet, wool fat, beeswax, and fixed oils.
Paraffins are not locally produced.
Fixed oils include: Olive, Peanut, Almond, Cotton Seed, Maize, Peach Kernel.
These may be regarded as interchangeable.

Soaps.

Animal Soap
Castile Soap
Soft Soap
(made with sodium hydroxide)
(i) Spirit Soap—
Soft Soap .. .. 6 oz.
Meth. Spirit to .. .. 10 fl. oz.
(ii) Ether Soap—
Oleic Acid .. .. 7 fl. oz.
Alcohol .. .. 4 fl. oz.
Sodium Hydroxide .. .. 600 gr.
Water .. .. 670 m.
Eucalyptus Oil .. .. 20 m.
Ether to .. .. 20 fl. oz.

Miscellaneous.

Epsom Salts Paste.

Naval, Military and Air Force.

SURGICAL PROCEDURES IN MILITARY HOSPITALS IN BRITAIN.

THE following extracts are from letters and reports addressed by the Consulting Surgeon of the Australian Imperial Force, Colonel Sir Thomas Dunhill, K.C., V.O., C.M.G., to the Director-General of Medical Services, Major-General R. M. Downes, C.M.G., V.D.

While in no way attempting a complete survey of procedures adopted in British Hospitals, Sir Thomas Dunhill's letters include much material of interest to the medical profession in general, and to the members of the Army Medical Corps in particular.

Treatment of Burns.

Severe burns result from the effects of incendiary bombs, and the emergency treatment consists generally of the application of some tannic acid preparation. The burns were often deep and extremely painful. Many of the men had severe burns of the face, and by the time they reached general hospitals pus was oozing from beneath the tan on the face and hands. Their eyes could only be opened with difficulty and purulent material was running from beneath the lids as well as from under the coagula on the face and hands. Every time the bed-clothes touched them the pain was intense and compelled them to jerk their hands up so that sleep was almost impossible.

These men were given continuous "Evipan" anæsthesia, and wherever pus was escaping or detected the coagulum was cut off and the site bathed with saline. Saline packs were applied to the face and the eyes bathed frequently. Where the burn was of second degree but an effective coagulum had formed this was not disturbed.

The treatment of burns of the hands has given rise to much difficulty. They are often deep, the tissues have become infected, in these areas the coagulum has been removed and a preparation of one per cent (1%) balsam of Peru in "Vaseline" spread on sterile wide-mesh net, the hand is then rested on lint and as far as possible left exposed to the air, the surface being kept clean with normal saline. In some instances the whole limb has been placed in saline baths. When the patients have become accustomed to normal saline the strength of the saline has been gradually increased until it reaches double strength.

Wrist-drop has occurred in two of these cases, and it was proposed to extend the fingers with safety pins piercing the tips of the fingers and attaching them to the racket-shaped splint in the dorsiflexed position.

The nerves of all men who have been burnt by incendiary bombs are badly shaken. They cannot feed themselves or help themselves in any way. The saline baths have been most comforting and the men love them.

Treatment of Wounds.

There has been a natural desire to try out the Trueta treatment, and when the wounded arrived, most of them had had a preliminary dressing and the limbs enclosed in plaster. Many of these wounds were in such excellent condition that our surgeons wished to leave them alone, relying on the fixation in plaster and the administration of sulphanilamide to hold the spread of sepsis in check. I was very sceptical of this, but did not feel justified in butting in too much in the beginning, for we have to work happily with our team, and I thought it wise that each surgeon should try out his ideas and gain his own experience so long as it did not prove detrimental to the soldier. At the end of three weeks temperatures were rising; some of the wounded were suffering severe pain and looking ill; œdema had become obvious. The plaster was taken off all of these, and in some a good deal of inflammation was present. Some wounds only required redressing and a fresh application of plaster to give comfort; in some wounds the inflammation had spread widely, and in some with shattering destruction and a good many spicules of bone present a limb may have to be sacrificed at this late stage.

This is not a condemnation of the "Trueta" method. These wounded men were dealt with as faithfully as possible where they were wounded. The plaster has enabled them to travel in more comfort than would have been possible with "Thomas" splints. These men had all been given sulphanilamide, and the administration of this was continued. In some of the wounded progress has been uninterrupted. In those who have not done so well the watching should have been more alert, the plaster removed earlier and the wound, if clean, redressed and the plaster reapplied. If infection appeared to be spreading they should have been dealt with by methods orthodox for such cases, including wide incisions, excision and cleaning up, removal of fragments and thereafter dressing the wounds, again reapplying plaster casts with provision for inspection.

The plaster which had been applied at the beginning of treatment has to be regarded as a splint for travelling. The plaster should not be regarded as a "Trueta" treatment unless complete *débridement* had been possible in the beginning. Owing to the conditions in the B.E.F. complete excision of destroyed tissues and the full application of the "Trueta" method has not been possible.

Sulphanilamide has not been given a fair trial in these patients; there has been widespread disruption of tissues, including bone, with areas of necrosis. Sulphanilamide has been used as a bacteriostatic and has apparently kept the patients well throughout their period of travelling and for a week or two thereafter. In the end the extent of the injury has been such that bacterial infection has flared up.

It boils down to this: simple treatment, plaster and sulphanilamide give comfortable and safe transport, but the patients should not be left too long without removal of the plaster, inspection of the wounds, and treatment given according to the condition found. The "Trueta" method as applied in Spain was used for wounds occurring close to the hospital, where skilled surgeons were able to give the full treatment at a very early stage.

The later treatment of these patients may either be in plaster or in Thomas splints on the Sinclair type of Balkan frame. There are few patients with compound fractures who could be made more comfortable in hospital than on a Thomas, but not for travelling.

Treatment of Wounds of Joints.

Shell injuries which pulp bone into big joints (or little ones for that matter) have always been watched with great trepidation; but we can say now almost without doubt that we can hold these in control and watch them gradually improving by keeping them completely immobilized. The joints should be opened only on the rarest occasions, when the temperature, tongue or general condition shows local pocketing is present. In many cases, although the bones are pulped right to the joint and are pouring out pus, the joint itself appears to have escaped infection unless the fragment has actually gone through it.

I do not yet know what the subsequent history of a large number of these patients will show; but we have not lost a case of this type, although they have suppurated and stunk beyond belief, have become fly-struck again and again; but the maggots have done good and not harm, except when they escaped too widely in the bed, and then only to the nerves of the matron. This sounds incredible; but Major Ross (Melbourne) has seen a lot of work while waiting for our hospital building, and has confirmed this in other hospitals. I believe Trueta has built better than he knew, in that he always insisted on accurate *débridement*, whereas in none of these has that been possible. Time may have been lost through lack of *débridement*, and the functional result may not be as good; but both lives and limbs are saved. We would not have learnt this had careful surgery been possible at the front.

These wounds had been given reasonably good, but very hurried, attention in the forward areas; all had been encased in plaster and had been five or seven days still encased in the original plaster before reaching us. The discharges had soaked the plaster, they smelt badly, and from time to time the patients had been very ill. Several of these patients appeared to need amputation, on the basis that the bones were so shattered and the infection already so obvious that they would either get septicæmia or amyloid disease, and under any circumstances would be very ill for a long time and almost certainly have to have amputation in the end. Orthopædic surgeons pleaded that they should be left for a few weeks, the plaster only removed when the temperature became high; purulent collections were opened, fresh dressings applied and plaster repeated. To my amazement, at the end of a month the tongues began to clean and the appetite to return; the infection had not travelled up into the shafts of the long bones, and although the knee or foot joints are still heavily infected (in some maggots everywhere) the patients feel better every day. The ultimate outlook is still doubtful, but the infection is certainly limited and absorption seems non-existent, even though the discharges contain streptococci.

What we have learnt ourselves is that plaster has given immobility. This has prevented the movement and muscular spasm following frequently opened dressings, which in the last war broke down protective barriers of granulation tissue and allowed the entrance of bacteria into the tissues and blood stream. Sulphanilamide has also done some good, but we have not yet been able to apportion out the relative value of these factors.

Injuries through the Feet.

Regarding injuries through the feet, it is doubtful if a foot with severe injuries of this type will ever become functional, and we have to be careful that the pain and sepsis do not destroy the morale more than a good amputation. You will remember that in the last war all of us in the beginning tried a little too long to save limbs and lost lives. In some hospitals amputation is now being performed fairly early. The patients we have with this type of injury are in the balance; but I do not intend to delay too long. In some cases these men for ten days or so were wonderfully well; now pain has returned and the temperatures begin to be hectic in character. The reason for the period of freedom from pain and absence from temperature is, I think due to the clean bodies and clean clothing, together with the sulphanilamide and the plaster. We have learned we should be thankful for the advantages given by these means, and also that we should not delay investigation when the wounded reach a hospital where investigation can be made.

Flesh Wounds.

Some of the comparatively superficial wounds have been extraordinarily indolent, even though fragments were small and removed early. Some of the shell-cases are extremely thin and are practically powdered by the explosion and driven deeply in.

The surgeons believe that indolence is due to thrombosis in the smaller vessels surrounding the injuries, even though the tissues are not completely devitalized. Fragments of clothing may not be found macroscopically at operation, but Professor Garrod has found in all of them tiny strands of clothing.

Many limbs have been amputated because the patients were becoming very ill, yet no gas gangrene bacteria had been found. Although clothing has been much cleaner than in the last war, the tiny strands that have got in,

together with the devitalization and the shattering of tissues, have resulted in necrosis.

Too much time may be lost in deep flesh wounds in trying sulphanilamide and blood transfusions. If openings are made and Carrel tubes inserted in the beginning, some of these cases may be saved. Where there are large sloughs in the intermuscular planes, areas of necrosis may have to be excised, and the risk of secondary hæmorrhage is appreciable.

Chests.

The men who got it badly through the abdomens or chests have never been collected; but we have a number of men in whom machine-gun bullets have lodged in the lungs with hæmothorax. These were closed and the bullets have been removed by us after several days, the thorax evacuated and the patients are well.

We have chest wounds which were opened over one or two days; these were closed before coming to us, and in some several aspirations have been sufficient, while in others closed drainage is acting well.

From the nature of the war the worst thoracic cases have never come to us; probably they have never been gathered.

Amputations.

These have all been circular, without flaps, most of them done a few days after the injury was received, when it had become obvious that the shattering was excessive or gas gangrene had commenced. With these I find the experience gained in the last war most valuable. Without exception my surgeons are relying far too much on laboratory tests and have no experience whatever in judging the condition of the patient from clinical observation. They are relying on blood examinations and other laboratory tests when they should know from the look on a man's face, the smell, and the examination of the wound itself that the patient has either gas gangrene or necrosis of intermuscular septa, or that the oozing presages secondary hæmorrhage. It is the same with very extensive flesh wounds, that is, of the buttocks or thighs. I found one man being given blood transfusions, with redressing of the superficial part of the wound, when, insisting on further and deeper examination, we drew out many sloughs six inches long. Disarticulation at the knee joint saved another man who was vomiting constantly and practically dying from sepsis, and in whom we took the risk of light anæsthesia and the simplest sort of disarticulation.

A man died from secondary hæmorrhage because the surgeon had disregarded two earlier small hæmorrhages from a stump that afternoon, and consequently he had failed to ligate the femoral artery. His amputation had been just below the knee. All this is merely to say that I believe far too much reliance is being placed on laboratory tests and not sufficient attention given to experience gained in the last war and forgotten since then.

The following is an extract from a letter from Colonel John Beattie, Director of Blood Transfusion, British Expeditionary Force, dated July 22, 1940.

Keeping properties:—As the bottles of blood prepared by the Supply Depot do not contain any air, but are topped completely to the top of the bung by the topping up machine, there is no exposure to foreign surface. Under the stress of war conditions in France many bottles of blood long out of date, that is, blood which had been taken more than 14 days before it was administered, were actually used. A considerable quantity of 4-5 week old blood was transfused without any ill effects and, in one case, a bottle of 7-week old blood was transfused by accident, but the patient suffered no ill effects. We are quite satisfied now that the keeping properties of the blood as prepared by our method are excellent, and that our theoretical limit of 15 days from the date of drawing the blood is, in reality, too conservative. We have learnt a great deal from the experience in Flanders, but a careful review of the whole situation has left us convinced that, for the purposes for which they were designed, the organization and apparatus have worked well.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 216, of October 24, 1940.

AUSTRALIAN IMPERIAL FORCE.

Australian Army Medical Corps.

To be Colonel—Major N. H. Fairley, O.B.E., Reserve of Officers, 3rd Military District, 15th July, 1940. *To be Majors*—Major K. C. Purnell, M.C., E.D., Australian Army Medical Corps, 3rd Military District, 1st September, 1940; and Captain C. H. Sippe, Australian Army Medical Corps, 1st Military District, 1st July, 1940; Norman Richard Wyndham, 24th May, 1940; Arthur Liddon Webb, 25th May, 1940; Captains T. C. Backhouse, Reserve of Officers, 1st Military District; J. R. Bell, Reserve of Officers, 3rd Military District; and Honorary Captain L. H. Ball, Reserve of Officers, 3rd Military District, 1st July, 1940; Thomas Giblin and Mostyn Levi Powell, 1st July, 1940. The notification respecting the appointment of Captain A. D. Byrne, Australian Army Medical Corps, 4th Military District, which appeared in Executive Minute No. 183/1940, promulgated in *Commonwealth Gazette*, No. 199, of 26th September, 1940, is withdrawn. *To be Captains*—Captain A. D. Byrne, Australian Army Medical Corps, 4th Military District, 21st May, 1940; C. P. Manson, Australian Army Medical Corps, 3rd Military District, 1st July, 1940; A. M. Macintosh, Australian Army Medical Corps, 2nd Military District, 1st June, 1940; M. M. Brown, Australian Army Medical Corps, 6th Military District; and A. C. Mendelsohn, Australian Army Medical Corps, 3rd Military District, 1st July, 1940; J. M. Agar and T. E. G. Robertson, Australian Army Medical Corps, 3rd Military District, 1st June, 1940; V. B. Brenton, Australian Army Medical Corps, 3rd Military District; R. A. A. Pellew and J. D. Rice, Australian Army Medical Corps, 4th Military District, 1st July, 1940; J. M. O'Connor, Australian Army Medical Corps, 1st Military District, 1st August, 1940; Y. E. Pittar, Australian Army Medical Corps, 2nd Military District, 14th March, 1940; Honorary Captains E. W. Casey, Reserve of Officers, 1st Military District, 22nd May, 1940; K. V. Smith, Reserve of Officers, 4th Military District, 1st June, 1940; Captains G. B. V. Murphy, Australian Army Medical Corps, 3rd Military District; B. T. Keon-Cohen and Honorary Captains D. M. Brown, Reserve of Officers, 3rd Military District; D. C. Dawkins, Reserve of Officers, 4th Military District; C. B. Berryman and R. W. Weaver, Reserve of Officers, 3rd Military District; F. J. B. Miller, Reserve of Officers, 4th Military District; and A. O. Green and D. I. Hart, Reserve of Officers, 3rd Military District, 1st July, 1940; William Medwyn Hutson, Arthur Harold Hodge and John Watson, 1st July, 1940; Captain S. A. McDonnell and Honorary Captain J. H. Samuels, Reserve of Officers, 1st Military District, 1st August, 1940. The notifications respecting the appointments of Norman Richard Wyndham and Arthur Liddon Webb which appeared in Executive Minutes Nos. 183/1940 and 189/1940, promulgated in *Commonwealth Gazette*, No. 199, of 26th September, 1940, are withdrawn.

To be Captains—Captains L. J. Cains, H. L. Hughes and J. P. Higgin, Australian Army Medical Corps, 2nd Military District, 1st August, 1940; Dudley De La Force Henry, 1st August, 1940.

To be Major—Captain A. D. Byrne, with regimental seniority next after Major F. K. Mugford, 1st July, 1940. Major C. W. Nye, E.D., is transferred to the Supernumerary List, 1st September, 1940.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

The probationary appointments of the following officers are confirmed: Flight Lieutenants A. W. Raymond, M.C., (Acting Squadron Leader) J. C. Fulton, O.B.E., and A. H. Penington.—(Ex. Min. No. 73—Approved 23rd October, 1940.)

The following are granted commissions on probation with the temporary rank of Squadron Leader with effect from the 14th October, 1940: Clifford Craig, M.D., M.S., F.R.A.C.S., Robert McMahon Glynn, M.B., B.S., F.R.C.S., F.R.A.C.S., D.O.M.S., D.L.O., Ivan Bede Jose, M.B., B.S., F.R.C.S., and Redford John Wright-Smith, M.D., F.R.A.C.P.

The notification appearing in the *Commonwealth of Australia Gazette*, dated 9th May, 1940, concerning Reginald James Stabback, M.B., B.S., is cancelled.

Reserve: Medical Branch.

The following are granted commissions on probation with the rank of Flight Lieutenant with effect from 7th October, 1940: Albert John William Ahearn, M.D., B.S., F.R.C.S., F.R.A.C.S., John Angelo Bassetti, M.B., B.S., Arthur Wellesley Bayley, M.B., B.S., John Catarinich, M.B., B.S., Keith Selwyn Harrison, M.B., B.S., M.R.C.P., Oliver Westwood Leitch, M.B., B.S., Norman Ludlow Newman, M.B., B.S., John Russell, M.B., B.S., Henry Walter Ritchie Sharp, M.B., B.S., Howard Mansfield Webber, B.A., M.B., B.S., Jenkyn Lawrence Williams, M.B., B.S.—(Ex. Min. No. 74—Approved 23rd October, 1940.)

The following are granted commissions on probation with the rank of Flight Lieutenant with effect from 1st September, 1940: Thomas Fielding Cowdray, M.B., B.S., and William Davies Cunningham, M.B., B.S., M.M.S.A. (London), M.R.C.O.G. (England).—(Ex. Min. No. 75—Approved 23rd October, 1940.)

Correspondence.

THE PUBLIC AND NUTRITION.

SIR: I desire, with your permission, to support with all the weight that I may command, beg, borrow or steal, the protest made, with force and vigour, in your issue of October 12 by Dr. E. P. Dark against the assumption that education is the only or the chief element in the problem of nutrition in Australia today. I did not hear the broadcast and must base my support to Dr. Dark on the facts as set out by him. But it has for some years seemed clear to me that quite undue prominence has been given by the medical profession to the disciplinary element—as we may term it—as against organization, in achieving the highest nutrition of the greatest number of young Australians. Authentic figures of the economic as against the domestic factors in subnutrition are doubtless available and, one must presume, are known to the Government and to the British Medical Association broadcaster. Immense resources, as we know, are squandered on luxuries such as the lottery, alcohol, "dogs", "horses" and so forth. And be it far from me to belittle the admirable work that has been done in the way of research and education—partly on the initiative of the British Medical Association. But "facts speak"; and when the census reveals that (some) 80% of the wealth of Australia is owned by (some) 10% of her people, and that spasmodic employment or "the dole" are still the lot of scores of thousands of Australian families, it is impossible not to feel that in this matter we are "putting the cart before the horse".

A personal experience may perhaps be permitted. When I was medical officer of health to the "Federal" Capital Territory in the late twenties and early thirties a situation arose which provided the opportunity for what seemed to me an interesting social experiment. An area of settlement—Russell Hill—admirably situated but (properly) secluded, had been surveyed and set aside by the Federal Capital Commission where men with families could erect dwellings on allotments free from any rent; but with the proviso that (if called upon) they must move at a three weeks' notice. Water and sanitation were provided at a cost to the "householder" of half-a-crown a week. During the depression years a large and quite flourishing settlement grew up. A school was provided; the residents built themselves a hall. Residences comprised almost every type of housing known to man, including some well-built cottages and many not so admirable. The gardens were a sight; "civic" pride was high. With the permission of the Director-General of Health building regulations were waived with the one inexorable proviso, that the conditions of living should accord with the *ipse dixit* of his medical officer of health.

The results were excellent. Instead of half the effective wage being spent on the roof, the whole went to food, warmth and the amenities of life. It was a regular rabbit warren for children, and the healthiest part of Canberra. Certainly it gave me the least trouble, since everyone knew that at a word from the Director-General it meant "outski"! The residents disciplined each other.

I do not propose this as an example for universal application. Certainly it has been the cause of much mud being thrown at Canberra; most recently by our latest—a very friendly—globe-trotting critic who, in the course of "Waltzing Matilda" observed of Canberra that we "lacked the imagination to rid ourselves" of the "worst slum area that I saw in the whole of Australia; dirty hovels of packing cases and tin cans that would disgrace a Kaffir kraal . . . death traps . . ." That he gravely errs in the matter of "rent" is obviously the result of a misleading hand, and (as I submit) in giving people with small incomes the chance, if they wished, of spending it all on food, warmth and amenities and of "cultivating their garden", we in Canberra put "first things first". Russell Hill, and what it stood for, is largely a thing of the past. But the conditions which created it still remain, a potential menace to Australia. And this also I will say, that not for ever will the "insults" which, on behalf of the underfed, Dr. Dark properly resents, be suffered without protest more effective than those which hitherto we have sidetracked.

Yours, etc.,

A. G. BUTLER.

Australian War Memorial,
Canberra,
October 16, 1940.

SIR: Dr. Dark's reference (in THE MEDICAL JOURNAL OF AUSTRALIA of October 12) to the broadcast talk on nutrition given by the Association's spokesman (October 2) is gratifying, as well for its commendation of the substance of the talk as for its indication of a lively interest in this new work. This is an interest which the evidence in our possession proves is shared now by an increasingly numerous public throughout the Commonwealth. The Department of Medical Sociology and Research continues to receive flattering reports on the humanity, the tone and the style of these broadcasts, with expressions of approval of the evident care in their preparation.

The purpose of these talks is popular education. It is to set out a balanced statement of the facts relating to various subjects in medical science, in a language and form which will make them readily intelligible to the untrained mind. This requires a novel, if not a new, technique, almost a new language. It is the view of the committee responsible, as it has consistently been the policy of the Association, that these talks should not become polemical. Thus in the talk on nutrition it was clearly our function to state the requirements in foodstuffs for health maintenance, but not to advocate any method or policy or distribution. If, for example, a child requires a pint and a half of milk daily for optimum health maintenance, where it is only receiving a third of that quantity, or perhaps none at all, it should be sufficient for us to state the fact. It is the function of government to act on our statement and others of equal authority, in arranging a more adequate distribution.

We cannot agree that we should, as Dr. Dark wishes, advocate this or that political policy because it may accord with our views on nutrition or any other medico-social subject. By so doing we should step from the public into the party field and so begin to forfeit the disinterestedness which in the public interest we should seek to preserve.

In the foregoing statement we have defined what we believe to be the right principle and practice for the Association in a matter of considerable and increasing importance. What attitude we should take as individuals is, of course, a question for the medical and social conscience of each of us.

Yours, etc.,

H. R. R. GRIEVE,
Chairman,
Committee on Medical Sociology and Research.

British Medical Association House,
135, Macquarie Street,
Sydney.
October 24, 1940.

OBSTETRICAL PRACTICE IN BRISBANE.

SIR: I do not think that the letter anent obstetrical practice should go unanswered, especially as it concerns the absent third party, namely, the nursing profession.

It is years now since I left Brisbane and have only returned six months ago. During this period the large and modernized hospitals have come into being and the standard is well up to anything I have encountered in other large or small cities and better than most.

The action of any nurse is only that desired by the particular medical man in charge of the case.

It has never been my experience to see the heavy labours of the sister holding back the recalcitrant head so vividly described; and if it were, I should blame only myself and my tardiness.

An unjust accusation should not go undefended and I hasten to do so.

Yours, etc.,

J. LLOYD SIMMONS.

Brisbane,
October 23, 1940.

Australian Medical Board Proceedings.

TASMANIA.

THE undermentioned has been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as a duly qualified medical practitioner:

McRae, Donald, M.R.C.S. (England), 1908, L.R.C.P. (England), 1908, Hobart.

VICTORIA.

AT a meeting of the Medical Board of Victoria for the month of October, 1940, the undermentioned were registered,

pursuant to the provisions of the *Medical Act*, 1928, of Victoria, as duly qualified medical practitioners.

Coplans, Joseph Moses, L.R.C.P., L.R.C.S. (Edinburgh), 1912, L.R.F.P.S. (Glasgow), 1912.
Rosenbloom, Leah, M.B., Ch.B. (Edinburgh), 1935.

The following additional qualifications were registered:

Colebatch, John Houghton (M.B., B.S., 1933, Univ. Adelaide), M.D., 1937 (Univ. Melbourne), M.R.C.P. (London), 1938.

Italian Reciprocity.—Advice having been received that the Anglo-Italian Medical Agreement of 1925 had lapsed owing to the outbreak of war, reciprocity with Italy in the matter of medical registration will not be recognized.

Partnership Registered.—Dr. G. R. Davidson and Dr. B. A. Baker, at Ballarat.

Improper Certificates.—The Board is inquiring into the giving of allegedly improper medical certificates in connexion with the non-attendance at school of certain children.

In this connexion it is pointed out that, under the provisions of the medical acts, the giving of untrue, misleading or improper medical certificates is an example of misconduct in a professional respect which may be regarded as sufficiently serious to be a ground for the removal of a practitioner's name from the medical register.

SOUTH AUSTRALIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1919 to 1935, of South Australia, as duly qualified medical practitioners:

Gurry, Leo John, M.B., Ch.B., 1938 (Univ. Edinburgh), Naracoorte.
Seldon, William Anthony, M.B., B.S., 1939 (Univ. Sydney), R.A.A.F., Adelaide.

The following additional qualifications have been registered:

West, Gordon Roy, Prospect, M.R.A.C.P., 1940.
Mill, James Davidson, Norwood, M.D., 1940 (Univ. Edinburgh).

Notice.

A MEETING of the clinical section of the medical board of the Royal Prince Alfred Hospital, Sydney, will be held at the hospital in the A2 lecture theatre on Monday, November 11, 1940, at 4.30 o'clock p.m. The meeting will last for approximately one hour and will consist of demonstrations by the departments of biochemistry, pathology and bacteriology. All medical practitioners are invited to be present.

THE next library seminar arranged by the Post-Graduate Directors of Medicine, Surgery and Pathology, will be held at the Prince Henry Hospital, Little Bay, New South Wales, on Monday, November 11, 1940, at 4.30 o'clock p.m. The subjects will be: (*a*) "Relation of Unilateral Diseases of the Kidney to Hypertension", (*b*) "Acute Liver Failure". A cordial invitation to be present is extended to all medical practitioners.

Books Received.

"An Investigation of the Technique of Psycho-Analysis", edited by E. Glover, M.D., Assisted by M. Brierley, M.B., B.Sc.; 1940. London: Baillière, Tindall and Cox (for the Institute of Psycho-Analysis). Demy 8vo, pp. 198. Price: 10s. 6d. net.

"A Handbook of Radiography", by J. A. Ross, M.A., M.R.C.S., L.R.C.P., D.M.R.E.; 1940. London: H. K. Lewis and Company Limited. Demy 8vo, pp. 134, with 67 illustrations. Price: 7s. 6d. net.

"Diseases Affecting the Vulva", by Elizabeth Hunt, B.A., M.D., Ch.B.; 1940. London: Henry Kimpton. Medium 8vo, pp. 215, with 36 illustrations and 18 plates in colour. Price: 21s. net.

"Diseases of Infancy and Childhood", by W. Sheldon, M.D., F.R.C.P., with a foreword by F. Still, K.C.V.O., M.A., M.D., LL.D., F.R.C.P.; Third Edition; 1940. London: J. and A. Churchill Limited. Demy 8vo, pp. 768, with 130 text figures and 14 plates. Price: 24s. net.

"Applied Pharmacology", by A. J. Clark, M.C., M.D., F.R.C.P., F.R.S.; Seventh Edition; 1940. London: J. and A. Churchill Limited. Demy 8vo, pp. 682, with 92 illustrations. Price: 21s. net.

"Heil Hunger! Health Under Hitler", by M. Gumpert; translated from the German by M. Samuel; 1940. London: George Allen and Unwin Limited. Crown 8vo, pp. 128. Price: 5s. net.

"Authority, Observation and Experiment in Medicine", by W. W. C. Topley, M.D., F.R.C.P., F.R.S. (Linacre Lecture, 1940); 1940. Cambridge: The University Press; Melbourne: G. Jaboor. Crown 8vo, pp. 46. Price: 1s. 6d. net.

Diary for the Month.

Nov. 12.—Tasmanian Branch, B.M.A.: Branch.
Nov. 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Nov. 19.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 20.—Western Australian Branch, B.M.A.: Branch.
Nov. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
Nov. 22.—Queensland Branch, B.M.A.: Council.
Nov. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 27.—Victorian Branch, B.M.A.: Council.
Nov. 28.—South Australian Branch, B.M.A.: Branch.
Nov. 28.—New South Wales Branch, B.M.A.: Branch.
Nov. 29.—Tasmanian Branch, B.M.A.: Council.
DEC. 3.—New South Wales Branch, B.M.A.: Executive and Finance Committee; Organization and Science Committee.
DEC. 4.—Western Australian Branch, B.M.A.: Council.
DEC. 4.—Victorian Branch, B.M.A.: Annual Meeting.
DEC. 5.—South Australian Branch, B.M.A.: Council.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide) All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

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